TEAC®
A-2020
SERVICEMANUAL

The final service manual is in the process of being prepared, if you desire one of these manuals or any question, please contact TEAC service section.

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SCHEMATIC DIAGRAM - TRANSPORT - AMPLIFIER
EXPLODED VIEWS AND PARTS NUMBERS

TEAC CORPORATION OF AMERICA
2000 COLORADO AVENUE
SANTA MONICA, CALIFORNIA 90404
U.S.A.

printed in Japan

SPECIFICATIONS

Heads:	Four, 4 track 2 channel 1 erase, 1 record/play forward 1 erase, 1 record/play reverse
Reel Size:	7" maximum
Tape Speed:	7-1/2, 3-3/4 and 1-7/8 ips
Motor:	1-Hysteresis synchronous outer-roter motor
Wow and Flutter:	7-1/2 ips: better than 0.12% 3-3/4 ips: better than 0.15% 1-7/8 ips: better than 0.20%
Fast Wind Time:	Approx. 90 seconds for 1200 feet
Frequency Response:	7-1/2 ips: 30 to 20,000 Hz (±3dB 50 to 15,000 Hz) 3-3/4 ips: 40 to 12,000 Hz (±3dB 50 to 7,500 Hz) 1-7/8 ips: 40 to 7,000 Hz
Signal to Noise Ratio:	50 dB
Crosstalk:	50 dB channel to channel 40 dB between adjacent tracks
Input:	Microphone: 600 ohms, 0.25 mV minimum required for program record level Line: 100 K ohms, 0.08 V minimum required for program record level
Output:	1 volt for load impedance of 50 K ohms or more
Monitor Headphones:	8 ohms
Speaker:	8 ohms
Power Output:	4 watts RMS continuous monophonic, load impedance 8 ohms
Semiconductor Complement:	All silicon transistor used: Preamp: 2SC486 x 2, 2SC372 x 6, 2SC491 x 2 Power Amp: 2SC486 x 2, 2SC491 x 4 10 silicon diodes
Power Requirements:	100/110/115/220 VAC 50 or 60 Hz, 70 watts
Dimensions:	22-1/4" x 14" x 11-1/2"
Weight:	44 lbs.

Specifications subject to change without notice.

CASE REMOVAL

Tape Transport:

Removal of Face Plate

1. Pull off speed selector knob and head covers.
2. Remove the two screws on the control lever and pull lever off shaft.
3. Remove the four screws on the face plate corners and the two screws just above the head assembly on the face plate tabs.
4. Carefully lift off the face plate.

Removing Chassis from Case

5. Remove the six screws on three sides of the chassis.
6. Lift the chassis out part way and disconnect the speaker plug on the upper left corner then lift chassis out completely.

Caution: If the chassis has to be placed face down, be sure to lay it on a soft mat, being careful not to bend or place undue strain on the reel shafts.

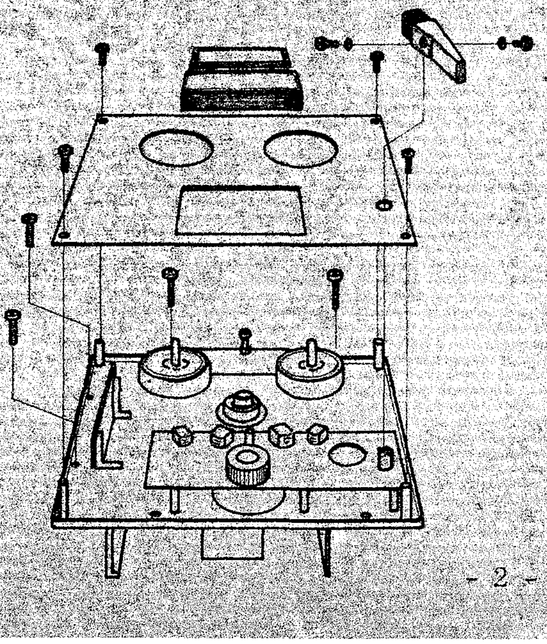
Amplifier:

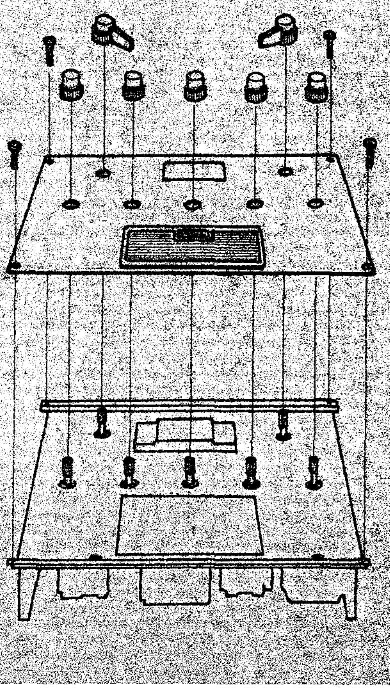
Removal of Face Plate

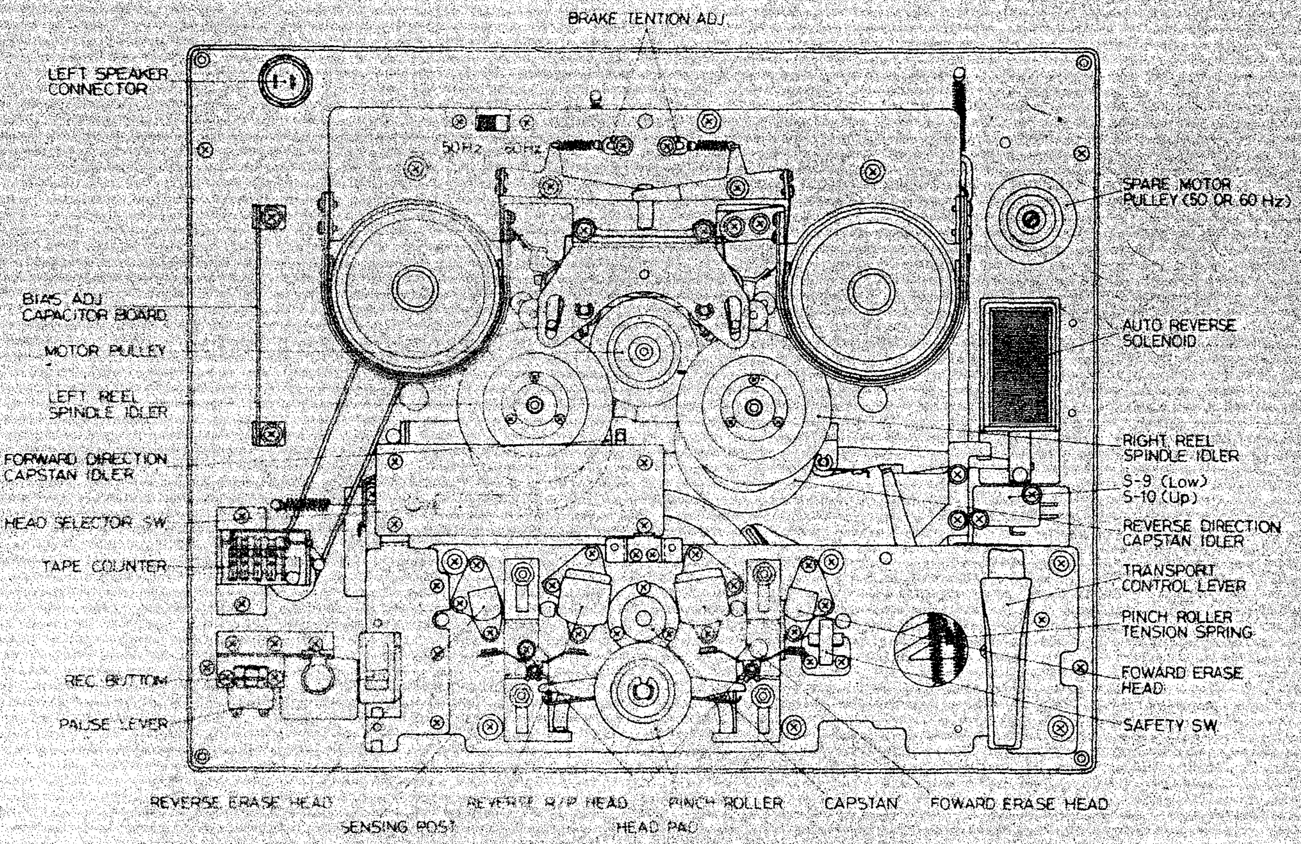
1. Pull off the seven knobs.
2. Remove the six screws on the upper and lower edges of the face plate.
3. Carefully lift off the face plate.

Removing Amplifier From Case

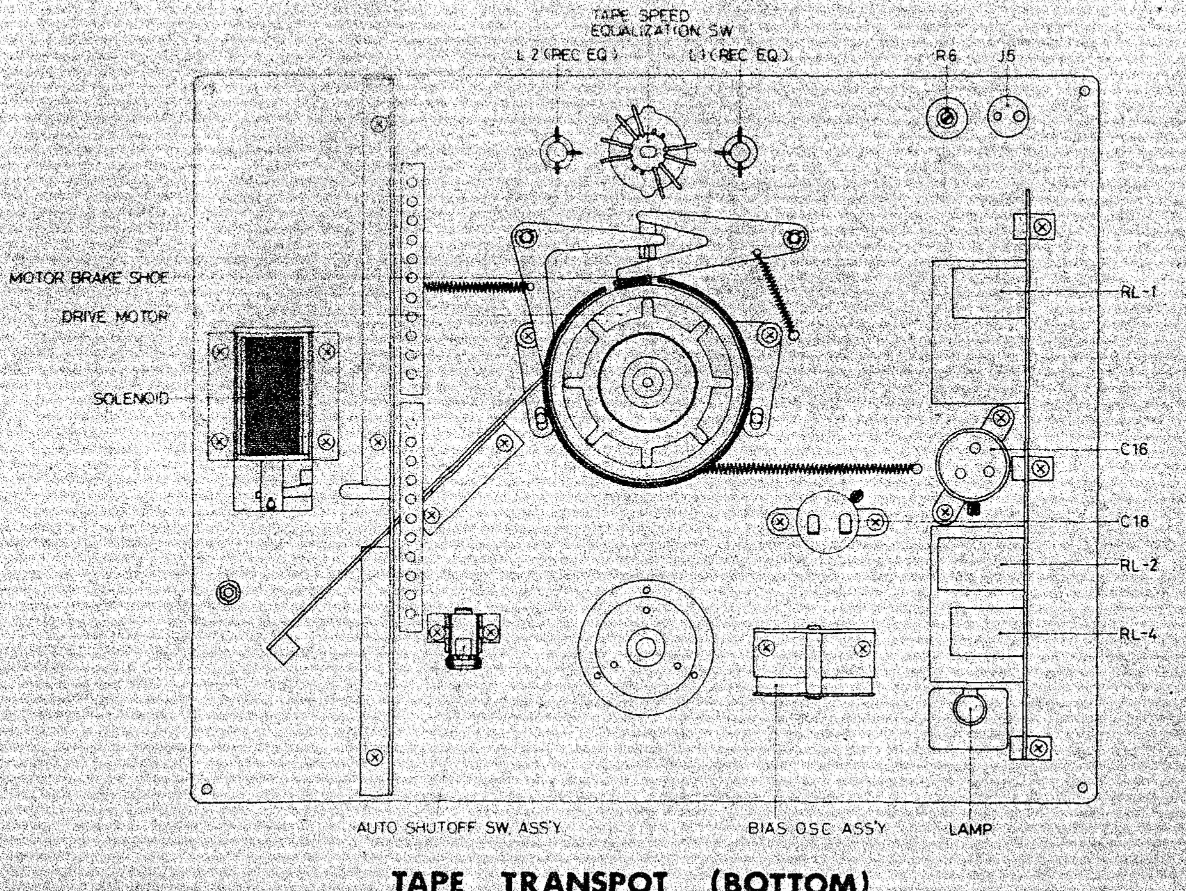
4. Remove the four screws in the slotted chassis holes.
5. Holding the small tabs on the sides of the chassis lift it out partially and disconnect the speaker plug on the upper right corner then lift the chassis out completely.






BRAKE TENTION ADJ.
LEFT SPEAKER CONNECTOR
50Hz
60Hz
SPARE MOTOR PULLEY (50 OR 60 Hz)
BIAS ADJ CAPACITOR BOARD
MOTOR PULLEY
LEFT REEL SPINDLE IDLER
AUTO REVERSE SOLENOID
FORWARD DIRECTION CAPSTAN IDLER
RIGHT REEL SPINDLE IDLER
S-9 (Low)
S-10 (Up)
HEAD SELECTOR SW
REVERSE DIRECTION CAPSTAN IDLER
TAPE COUNTER
TRANSPORT CONTROL LEVER
PINCH ROLLER TENSION SPRING
REC BUTTOM
FOWARD ERASE HEAD
PAUSE LEVER
SAFETY SW
REVERSE ERASE HEAD
REVERSE R/P HEAD
PINCH ROLLER
CAPSTAN
FOWARD ERASE HEAD
SENSING POST
HEAD PAD

TAPE TRANSPORT (TOP)


TAPE SPEED EQUALIZATION SW
L 2 (REC EQ)
L 1 (REC EQ)
R6
J5
MOTOR BRAKE SHOE
DRIVE MOTOR
RL-1
SOLENOID
C16
C18
RL-2
RL-4
AUTO SHUTOFF SW. ASS'Y
BIAS OSC ASS'Y
LAMP

TAPE TRANSPOT (BOTTOM)

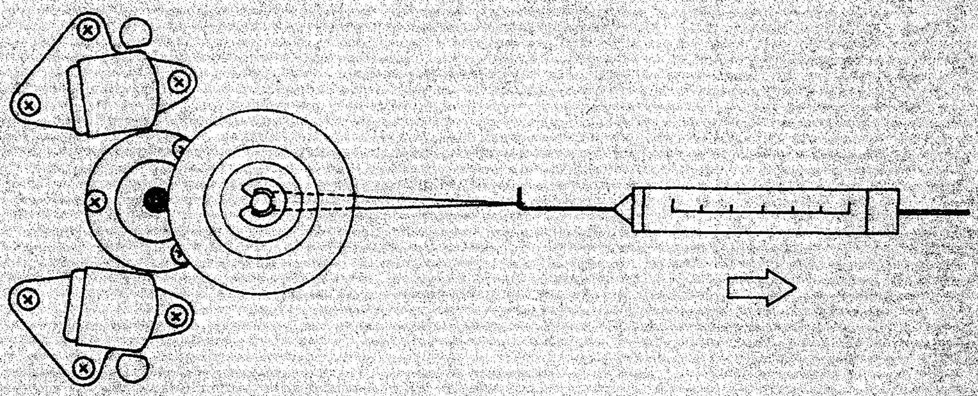
MECHANICAL CHECKS AND ADJUSTMENT

Equipment Required: Spring Scale: 0 to 2 oz (Reel torque, tension, Head pad pressure)
0 to 8 oz (Brake torque)
0 to 64 oz (Pinch roller pressure)
Empty Reel: 4" diameter hub (Brake torque)
2" diameter hub (Reel torque, tension)
10" length (Pinch roller pressure)
30" length (Reel torque, tension)
Blank Tape: 15" length 1 mil base (Head pad pressure)
Test Tape: TEAC flutter free tape, TAS 19 TAS 9. 5
Wow Meter: Sentinel Inc. Model FL-3D-1
Digital Frequency Counter: Capable of 0 to 5 KHz indication

Pinch Roller Pressure

The pinch roller pressure against the capstan should be 4 lbs. in the play mode.
Note: No power is required for this check.

1. Remove the head covers.
2. Make a strong twine loop about 10" in diameter.
3. Place this loop behind the pinch pinch roller and around the pinch roller shaft. Attach a 0-8 lbs. Spring Scale to the other end of the loop.
4. Place the transport control lever in the forward play position.
5. Slowly draw the scale away from the pinch roller and take a reading at the instant the pinch roller leaves the capstan.
6. No adjustment should be required. If however, the pinch roller pressure is excessively low and causing problems, the pinch roller spring needs to be replaced. No other adjustment is provided.

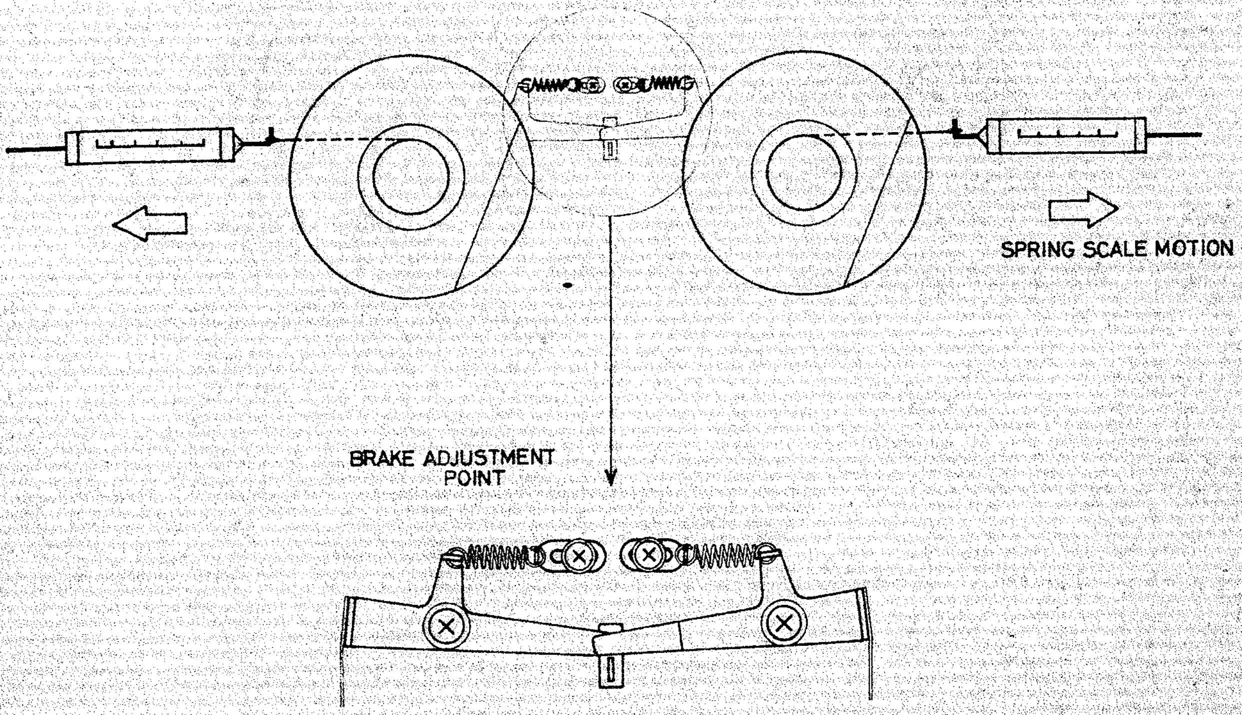


Pinch Roller Pressure Measurement

Brake Adjustment

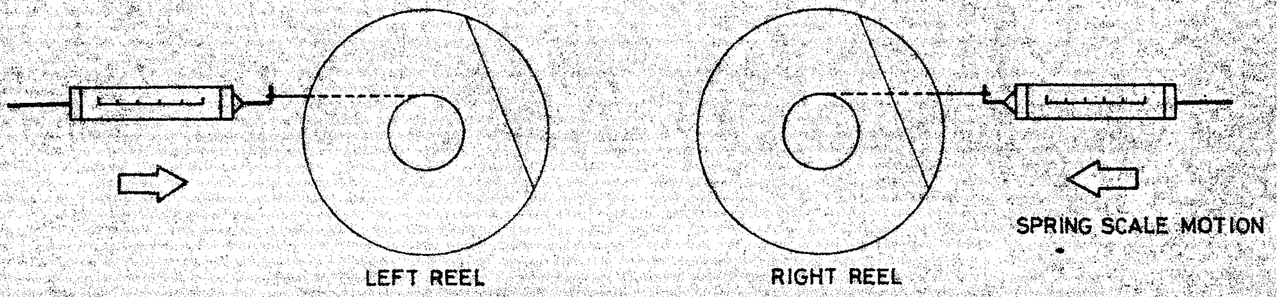
Note: No power is required for this check and adjustment.

1. Make a small loop at both ends of a 30" length of string.
2. Place an empty 7" reel with 4" diameter hub on the left reel turntable.
3. Attach one loop to the anchor on the reel hub and the other to a suitable spring scale.
4. Wind several turns of string around the hub counterclockwise.
5. Pull the scale away from the reel, making certain the string does not rub the reel flanges. Take a reading only when the turntable is in steady motion because the force required to overcome the static friction will produce a false and excessively high initial reading.
6. The scale reading should be between 5.6 to 7.0 oz. If adjustment is required, remove the transport face plate, loosen the screw holding the brake spring and move the small spring retainer until the desired pressure is obtained.
7. To adjust the right brake repeat all the previous steps with the exception that all directions of rotation are clockwise.
   Note: The difference in tension between the left and right brake should be kept within 1.4 oz.

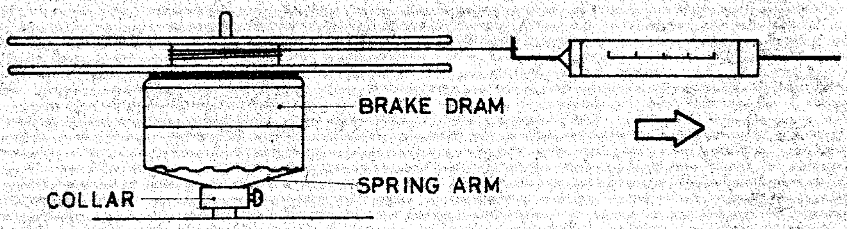


Take-up Torque

1. Place an empty 7 inch reel with a 2 inch diameter hub on the right reel turntable. Block the auto-shutoff arm in the on position.
2. Make small loops at both ends of a 30 inch length of string. Attach one end to a suitable spring scale and the other end to the tape anchor on the blank reel.
3. Place the transport lever in the forward play mode and, making sure the string does not rub the reel flanges, allow the counterclockwise rotation to draw the scale toward the hub holding back with enough tension to allow a steady reading. The scale should read 2.1 oz.
4. Repeat the procedure for reverse play by placing an empty reel on the left turntable. The direction of rotation will be clockwise.
5. If adjustment is required, remove the transport chassis from the case. There are two methods of adjustment: (1) A rough adjustment can be made by loosening the collar holding tension against the spring arms. (2) A fine adjustment can be made by rotating the spring arms on the stepped bottom drum. Each step represents a 10 gram change.
   Caution: Do not overtighten the collar set screw. The drum shaft is hollow and could be crushed.



Take-up Torque Measurement

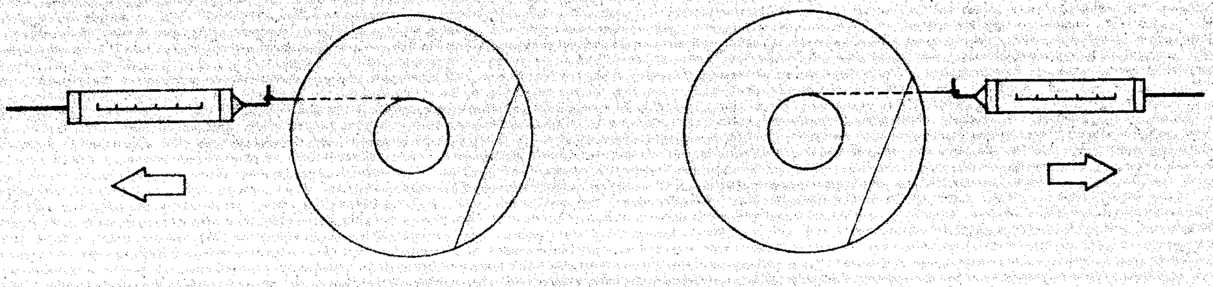


Take-up Torque Adjustment

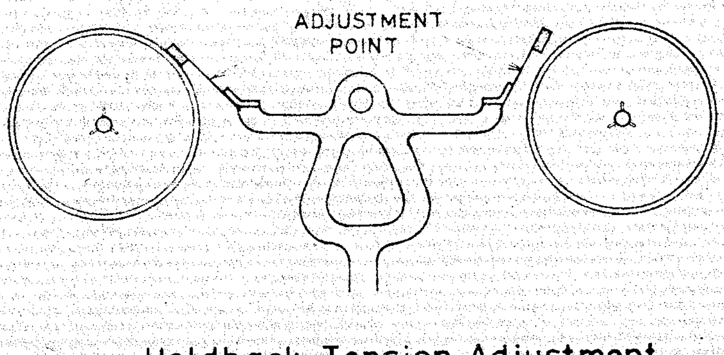
Holdback Tension

Note: No power is required for this check and adjustment.

1. Place an empty 7" reel with a 2" diameter hub on the left reel turntable.
2. Make small loops at both ends of a 30" length of string.
3. Attach one loop to the anchor on the reel hub and the other to a suitable spring scale.
4. Wind several turns of string around the hub, counterclockwise.
5. Place the transport control lever in the forward play position.
6. Pull the scale away from the reel making certain the string does not rub on the reel flanges. Take a reading only when the turntable is in steady motion.
7. The scale reading should be 0.7 oz. If adjustment is required, remove the transport face plate and bend the flat spring arm, which presses the square felt-pad, against the lower reel drum.
8. To adjust the right reel holdback tension repeat the previous steps with the exception that all directions of rotation are clockwise and the transport control lever is in the reverse play position.



Holdback Tension Measurement

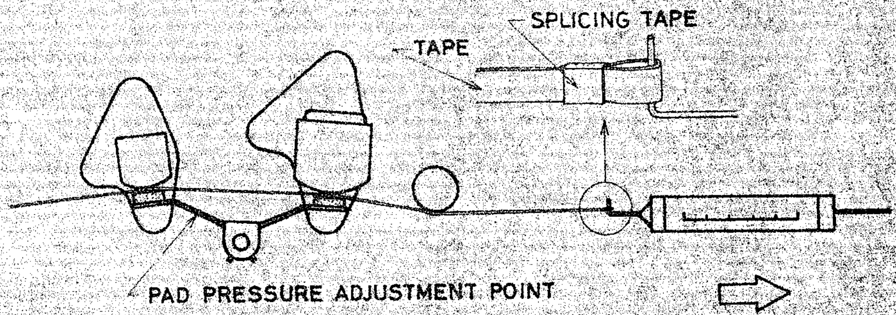


Holdback Tension Adjustment

1.0~1.2 oz

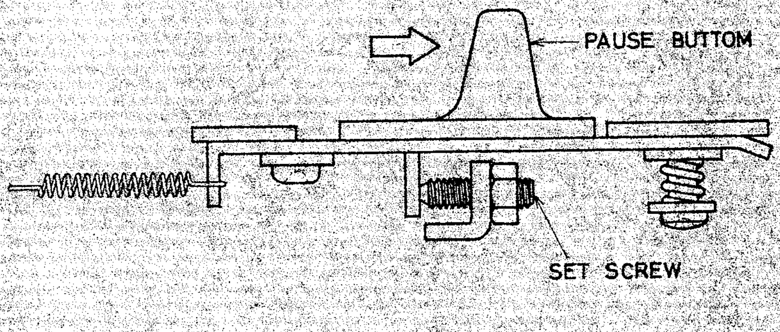
Head Pad Pressure

1. Remove the head covers and pull of the pinch roller.
2. Fasten a suitable spring scale to one end of a 30 inch pieces of 1-1/2 mil tape
3. Place this tape between the tape guides and move the transport to forward play.
4. Read the scale while pulling the tape past the heads from left to right. The scale should read 1.0~1.2 oz
5. If adjustment is required, bend the spring metal pressure pad arms.
6 Repeat the procedure for the reverse mode by placing control lever in reverse play and pulling the tape from right to left.



Pause Adjustment

1. With the transport lever in the forward play position, the pinch roller should be clear of the capstan by 0.5mm, when the pause lever is depressed
2. If adjustment is required, remove the transport chassis from the case.
3. Loosen the lock nut on the set screw below the pause lever and adjust the set screw for proper pinch roller to capstan clearance. Tighten the lock nut. The brakes on both drums should be clamped.



Pause Adjustment

MECHANICAL PARTS REPLACEMENT

Idler Replacement

Note: There are three types of rubber idler wheels employed. The two tope ones are not interchangeable since a special built-in cam allows them to rotate only in opposite directions - the right one clockwise and the left one counterclockwise. The two lower idlers are interchangeable.

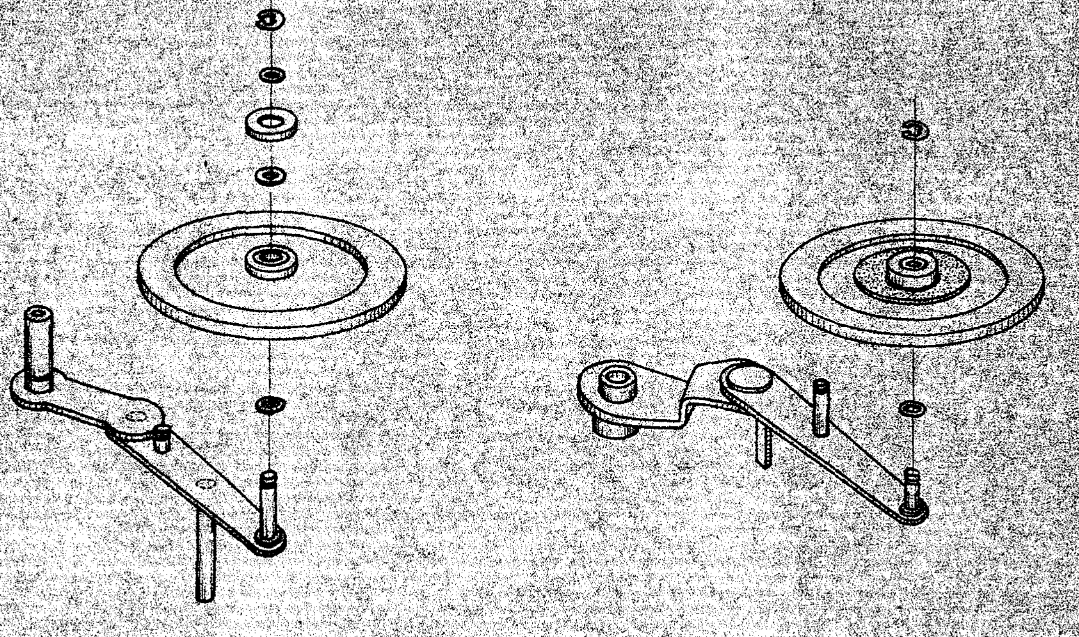
1. Remove the 4 E-shape clips and 2 screws on the C shaped plate above the motor pulley gently lift this plate off the mounting studs.
2. Remove the 2 nuts holding the top idlers to the shaft and pull idler from shaft
3. To remove the lower idler wheels the top ones should be removed first. Remove the small E clip holding the lower idler to the shaft and pull off gently.

Capstan Replacement

This procedure is very difficult and should only be performed by a thoroughly trained service technicians. Damage to the transport could result if care is not taken in performing this operation.

Motor Pulley Replacement

Loosen the two set screws on the motor pulley and while holding the two top idler wheels away from the pulley lift it off the motor shaft.

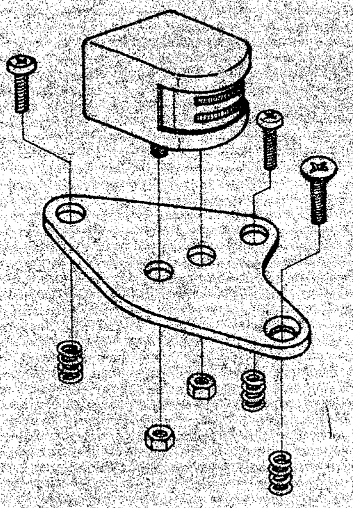


Idler Replacement

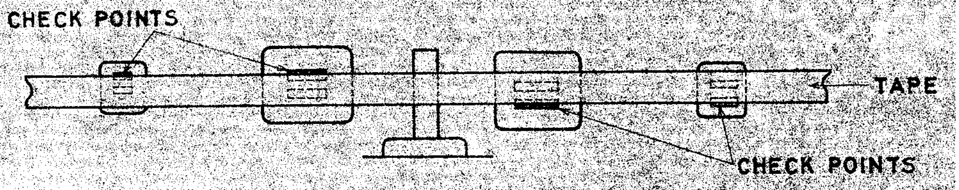
HEAD REPLACEMENT AND ALIGNMENT

Head Replacement and Mechanical Alignment

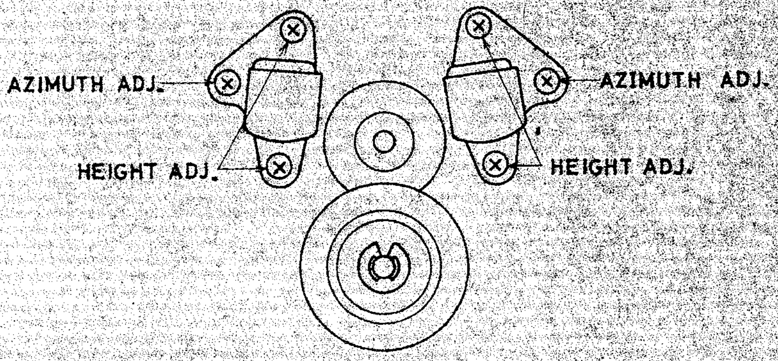
1. Remove the deck face plate.
2. Locate the wires from defective head note points to which they are soldered.
3. Using a low heat iron unsolder the wires of the defective head from the terminal board.
4. Remove the 3 screws securing the head mounting plate.
5. Remove the 2 nuts on the underside of the plate and remove the head.
6. Install the new head on the mounting plate then route the wires and solder them to the board.
7. Remove the pressure pads for the respective head by removing the small E clip on the shaft.
8. Thread a length of tape with oxide removed across the heads and observe the position of the head poles. Adjust the three screws until desired head height is achieved. Make sure the face of the head is parallel with the tape guide surfaces. Head height is a critical adjustment. A good guide is to have the erase head pole above the edge of the tape by the thickness of a heavy pencil line and the rec/play head pole above the edge by the thickness of a thin pencil line. Refer to Figure below.



Head Disassembly



Front View



Top View

PLAYBACK PERFORMANCE AND ADJUSTMENT

Equipment Required

Test Tape:	TEAC 62801 or AMPEX 31321-01
AC VTVM:	For bias voltage measurement
Level Meter:	Use of the TEAC M-826 test set is recommended. This set incorporates a level meter, audio oscillator channel selecting switch, variable attenuator and monitor speaker.
Oscilloscope:	General

Rec/Play Head Azimuth Alignment

1. Connect the AC VTVM to measure AC voltage at Line Output.
2. Thread playback test tape on the tape deck. Set tape speed to 7-1/2 ips.
3. Set METER switch to OUTPUT.
4. Play a 12 or 15 KHz test tape tone and turn azimuth adjustment screw of the forward rec/play head until a maximum peak is obtained on the VTVM.
5. Place the transport in reverse play and turn azimuth adjustment screw of the reverse rec/play head for maximu peak on the VTVM.

Output Level Set

6. While playing a 700 Hz signal recorded at normal operating level (0 dB), adjust VR-103 (L-channel) and VR-203(R-channel) for a 0 dB (.774 v) output at the line output jacks. Adjust VR-105 (L-channel) and VR-205 (R-channel) for a 0 VU indication on the VU meters.
   Caution: Clean and demagnetize heads before proceeding.

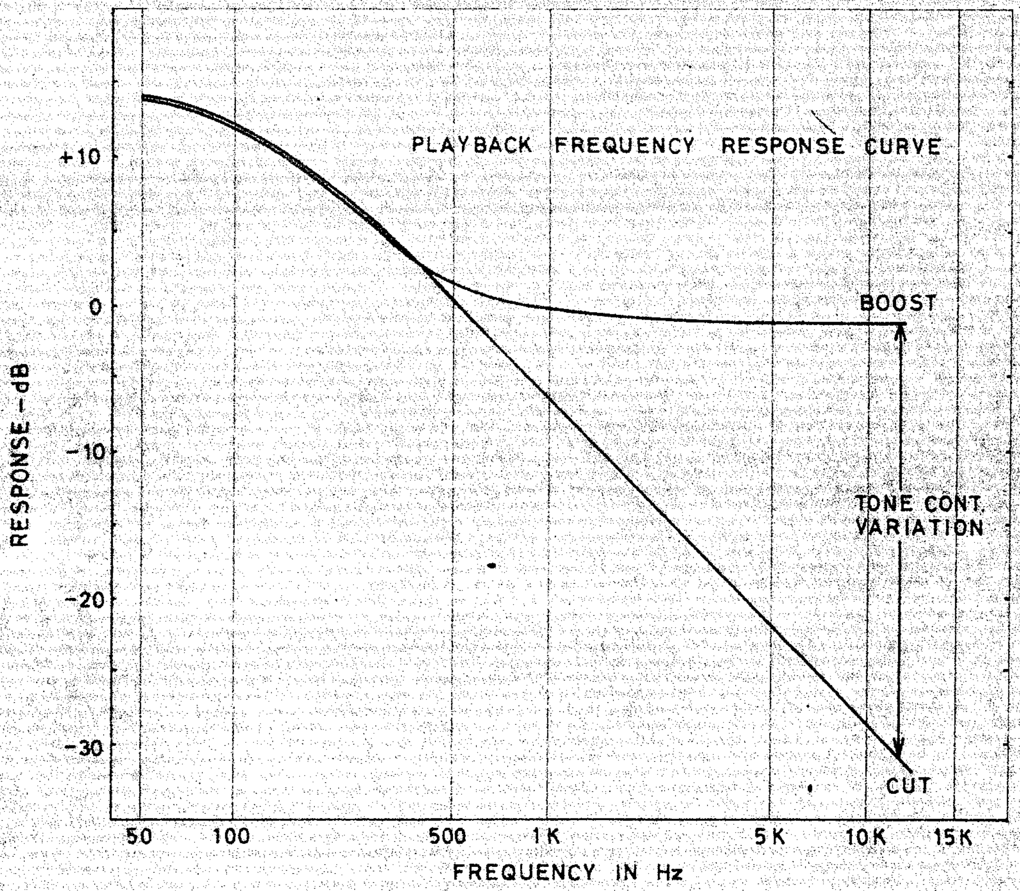
Playback Frequency Response Check

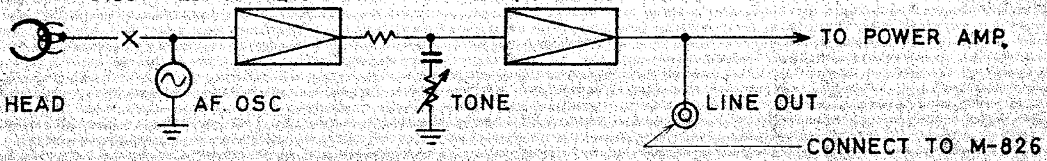
7. Play a 500 to 700 Hz reference tone (recorded 10 dB below operating level). The VTVM should read approximately -10 dB.
8. Play the test tape tones from 12 or 15 KHz down to 50 Hz, observing the output on the VTVM. The output level should be close to the 500 or 700 Hz reference tone output. Adjust the tone control for the flattest response within the limits illustrated in Figure. Make this test in both directions.
   Note: The tone control affects the line output response. It is calibrated in 11 increments. The flat response setting should occur between position 4 and 6 counting clockwise. If the flattest setting between forward and reverse is not the same yet remains in the 4 to 6 range, then the mid point between the settings should be considered the flat response position for all other adjustments and checks. If the reverse direction output does not fall within specifications the reverse rec/play head should be suspected as being faulty. Consequently, if the output in the forward direction cannot be adjusted within specifications, the forward head may be faulty.

9. After having found the flattest position of the tone control, mark this point for reference in record checks

Playback Amplifier Check

If a complete playback mode check is desire, connect an Audio Oscillator to the playback input circuit as shown in Figure below. Then check the frequency response, noise, amplifier gain, etc. Figure shows a typical frequency response curve. This is a high gain circuit and excessive input may cause overloading and distortion in the amplifier. Adjust the level of Audio Oscillator so the VU meter indication is kept below 0 VU. Make certain that the Audio Oscillator and input cables are free from hum and noise which may cause false readings.




DISCONNECTION
Q101
Q102～103
TO POWER AMP.
HEAD
AF. OSC
TONE
LINE OUT
CONNECT TO M-826

Playback Amplifier Check

Power Amplifier Noise and Distortion Check

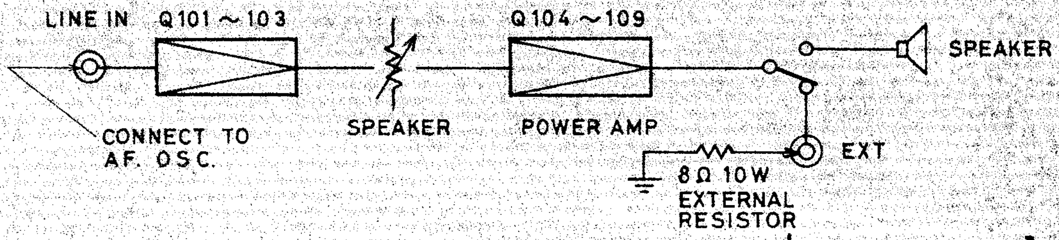
Note: Tape is not required for these tests.

Noise Check:

1. Set the RECORD SELECT to PLAY and SPEAKER SELECT to STEREO. Adjust the tone control to the previously determined flat position (between graduate 4 and 6). Turn the SPEAKER controls fully counter-clockwise.
2. Connect 8 ohms 10 watts resistors to the EXT. SPEAKER jack of each channel.
3. Connect VTVM across the 8 ohms resistor. The meter should read -50 dB or less.

Distortion Check:

4. Apply a 1 KHz signal 0 dB level to the LINE INPUT.
5. Set RECORD SELECT to STEREO. Turn SPEAKER controls fully clockwise.
6. Connect an oscilloscope across the 8 ohm resistor and advance RECORD level until clipping occurs.
7. Connect VTVM across 8 ohm resistor. The reading should be 5.7 v or more.


LINE IN
Q101 ~ 103
Q104 ~ 109
SPEAKER
CONNECT TO
AF. OSC.
SPEAKER
POWER AMP
EXT
8 Ω 10W
EXTERNAL
RESISTOR

Power Amplifier Check

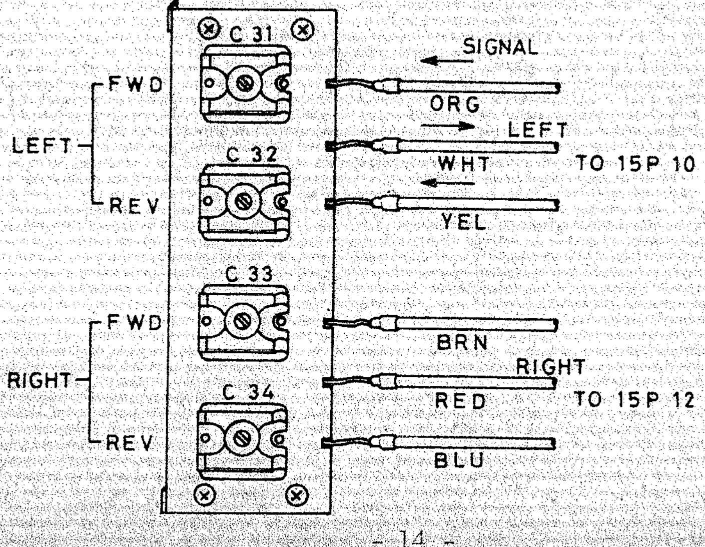
RECORDING PERFORMANCE AND ADJUSTMENT

Bias Voltage Adjustment

Note: The following adjustments also cover equalization and frequency response. Be sure to set the tone control to the flat position as determined by the playback test.

1. Remove the transport front panel and remove the screws securing the bias trimmer board. This allows adjustment without removing from case.
2. Set the mode switch to STEREO REC and place the recorder in the record mode.
3. Connecting a VTVM (10M ohms input impedance) to test points illustrated in Figure, adjust bias voltage for each track to 32 volts ± 3 v by adjusting C-31, 32, 33 and 34.
4. Connect an Audio Oscillator to line input. Set it for -35 to -40 dB output.
5. Set the record level to maximum and tape speed to 7-1/2 ips.
6. Using a new blank tape, make a recording 30 seconds or longer of a 500 Hz and 10 to 15 KHz signal.
7. Rewind tape and play back this recording. The line output level for the 500 Hz signal should be -15 to -20 dB. The output level for the 10 to 15 KHz signal should be within the limits illustrated in Figure. If the level is too high, increase the bias voltage; if it is too low, decrease the voltage but do not decrease below 28 v.
8. Check for left to right channel high frequency balance and adjust L-1 or L-2 to compensate.

   Note: If these adjustments do not provide satisfactory results, check C-22 and C-25 located on the rear of the transport chassis. These capacitors must be 0.022 mfd. Since this value is very critical slight changes can cause poor results. Make these checks for both directions. If a check is made at 3-3/4 ips be sure to reset tone control for flattest setting, which should be between graduate 7 and 8. However, make all adjustments at 7-1/2 ips.



Bias Trap Adjustment

1. Place the recorder in the record mode with no signal input.
2. Connect a VTVM to the junction of L-102 and C-116. Adjust the core of L-102 for minimum reading on the VTVM. Repeat for right channel, connecting to junction of L-202 and C-216. Adjust L-202 for minimum reading.
3. Connect VTVM to the left LINE OUTPUT jack and adjust L-101 for minimum reading. Adjust L-201 for right channel minimum reading. Note: These tank circuits prevent the bias signal from entering the record amplifier and under normal, no signal conditions voltage should not be present at the above points.

Level Calibration

Note: Perform playback calibration first. Use of the tape counter will help to pinpoint the start and stop points of the signal and prevent confusion during this check.

1. Set RECORD controls to maximum.
2. Connect test equipment as shown in Figure. Apply a 500 Hz signal at exactly -20 dB level. While recording this signal adjust VR-102 and VR-202 for 0 VU.
3. Rewind and play back this recording. The playback level should read 0 VU. If not, adjust VR-106 and VR-206 and once more make a 500 Hz -20 dB recording. Repeat this procedure, adjusting VR-106 and VR-206 until a 0 VU indication is obtained when playing back the recorded signal.

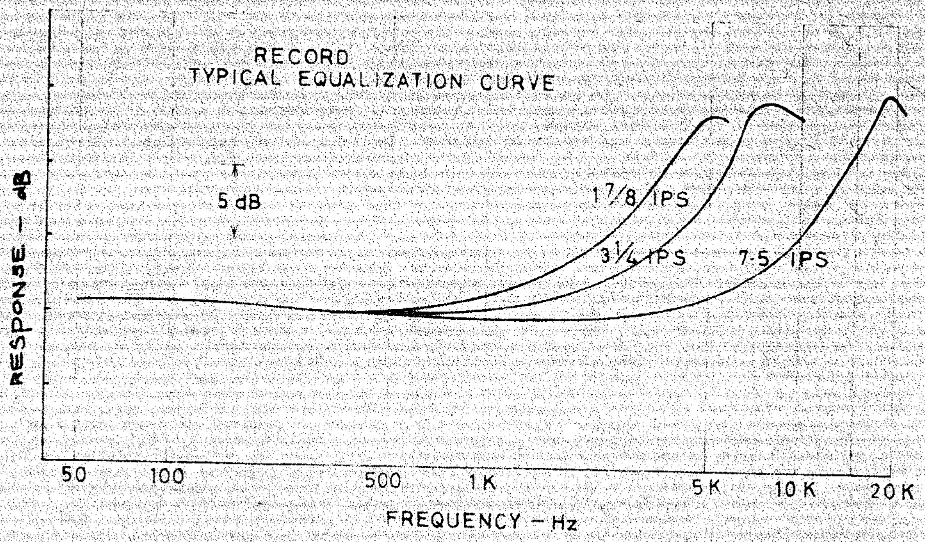
Record Noise and Erase Check

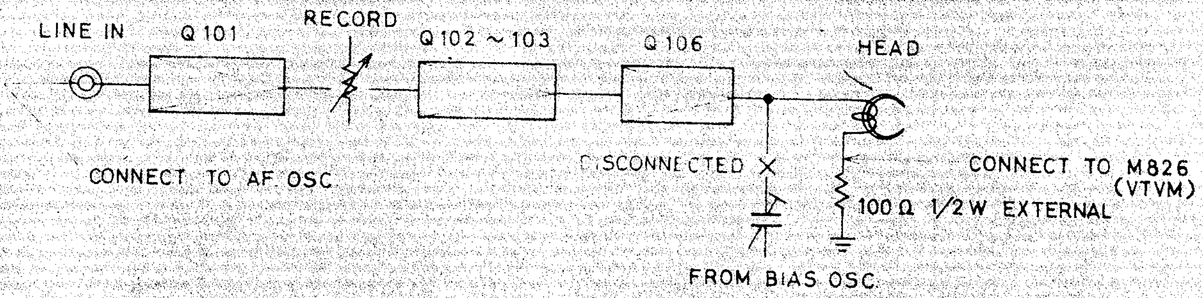
Note: Clean and demagnetize the heads before proceeding.

1. While recording a 1 KHz signal, adjust the RECORD level controls to obtain a 0 VU level meter reading. The output level of the VTVM connected to the line output should be 0 dB. Use the tape index counter to note the beginning and end of the recording. About 30 seconds should be sufficient.
2. Disconnect the line input and set the RECORD levels to minimum.
3. Rewind the tape to the start of the 1 KHz recorded signal.
4 Record over this signal and after it has been erased rewind the tape once more and measure the noise level while playing back. Check the signal to noise ratio for both channels at all speeds in both directions. The noise level should be -50dB or less. This represents the signal to noise ratio for 3% total harmonic distortion.

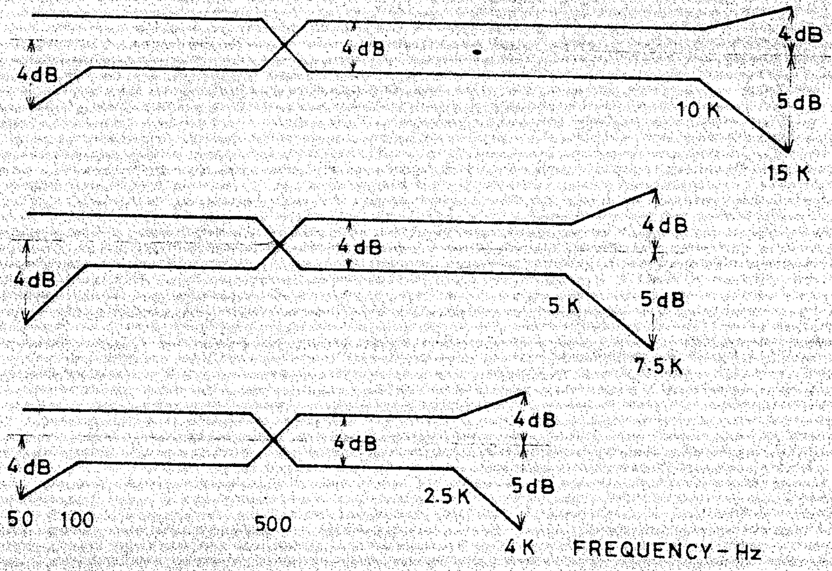
Record Amplifier Check

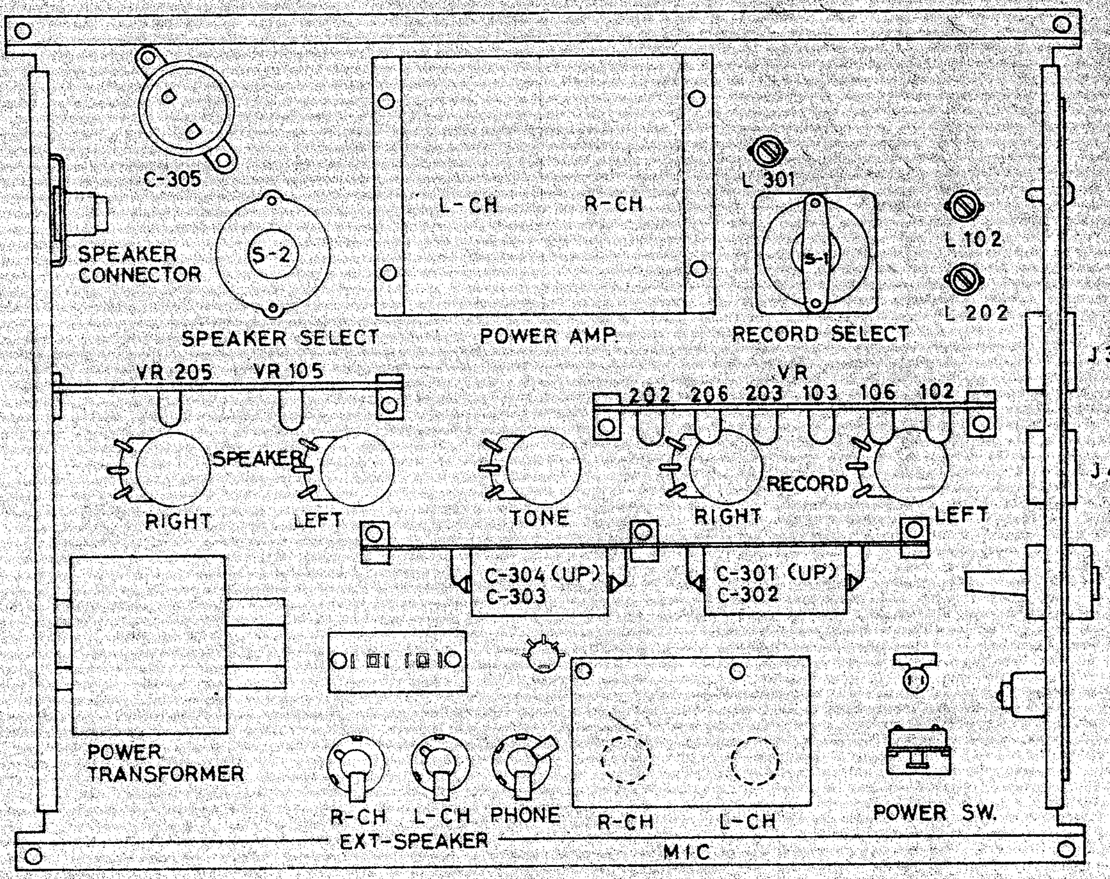
If a more complete check of the record amplifier is required, connect a VTVM to the record circuit as shown in Figure. Check the frequency response, noise, amplifier gain, etc. To avoid overloading the amplifier the frequency response check should be made at least 15 to 20 dB below normal operating leve



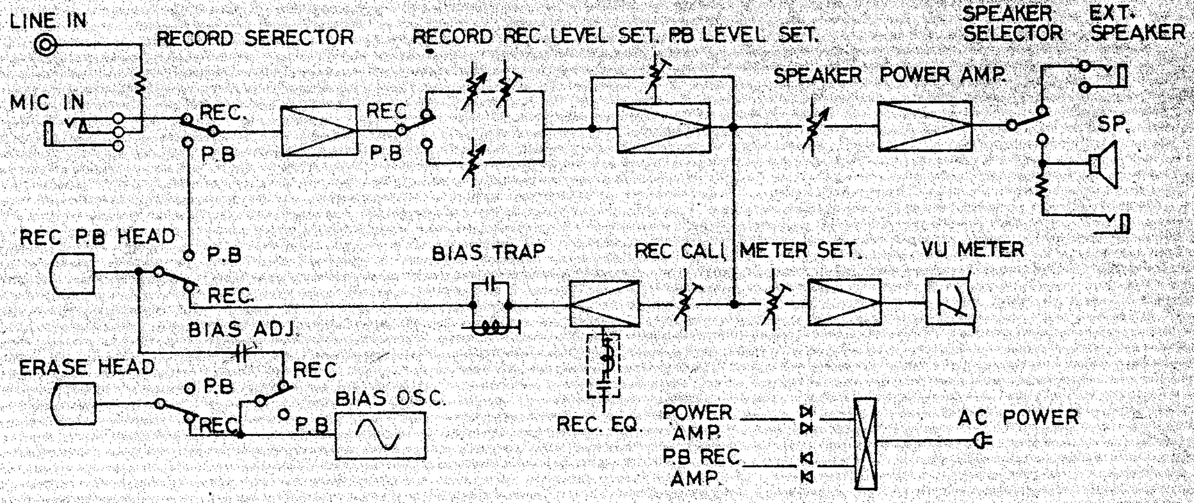

LINE IN
Q 101
RECORD
Q 102 ~ 103
Q 106
HEAD
CONNECT TO AF OSC
DISCONNECTED
CONNECT TO M826
(VTVM)
100 Ω 1/2 W EXTERNAL
FROM BIAS OSC

EQUALIZED REC/P.B FREQUENCY RESPONSE LIMITS

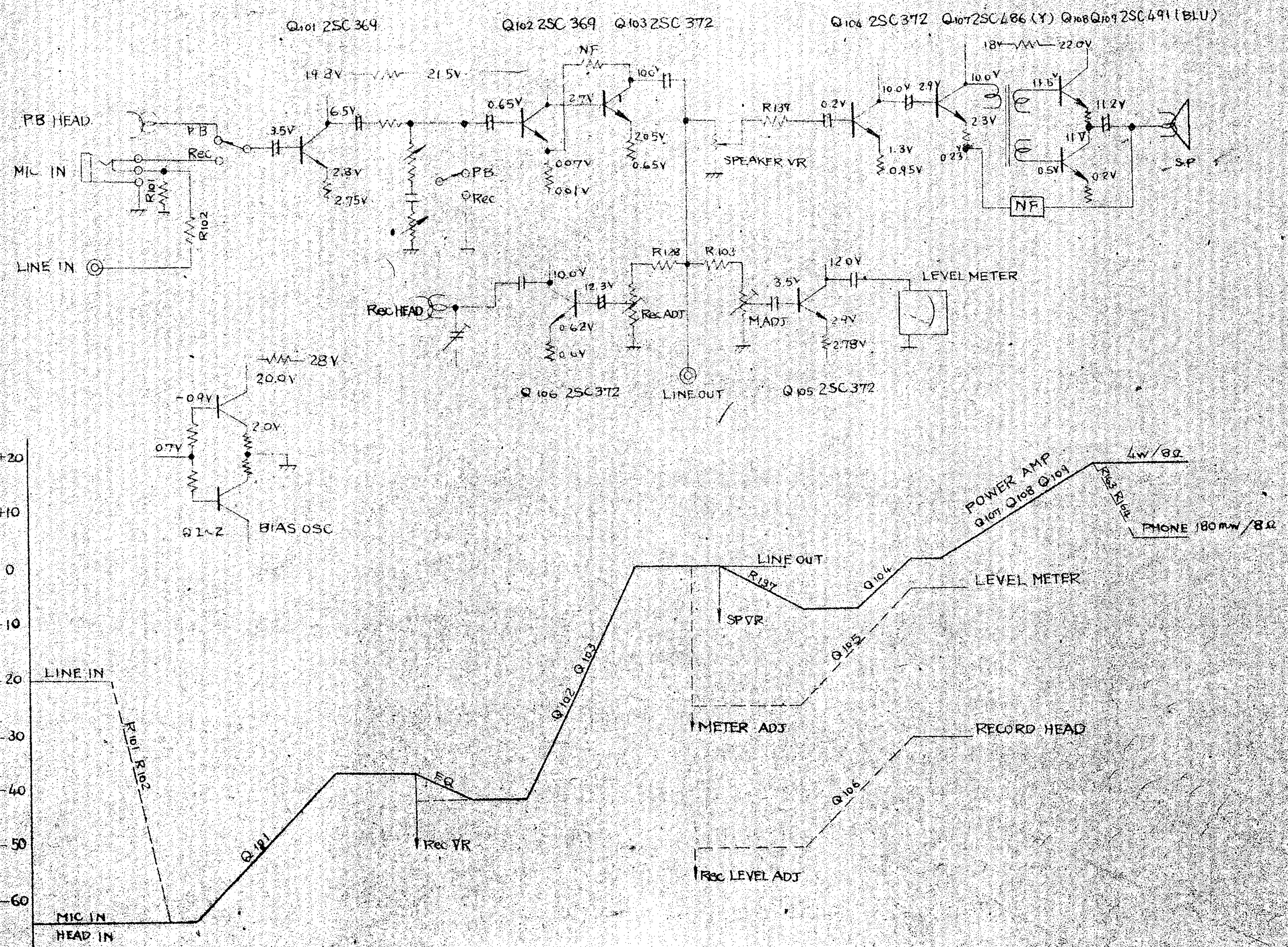



C-305
SPEAKER CONNECTOR
S-2
SPEAKER SELECT
L-CH
R-CH
POWER AMP.
L 301
S-1
RECORD SELECT
L 102
L 202
J 3
J 4
VR 205
VR 105
VR
202
206
203
103
106
102
SPEAKER
RIGHT
LEFT
TONE
RECORD
RIGHT
LEFT
C-304 (UP)
C-303
C-301 (UP)
C-302
POWER TRANSFORMER
R-CH
L-CH
PHONE
EXT-SPEAKER
R-CH
L-CH
MIC
POWER SW.

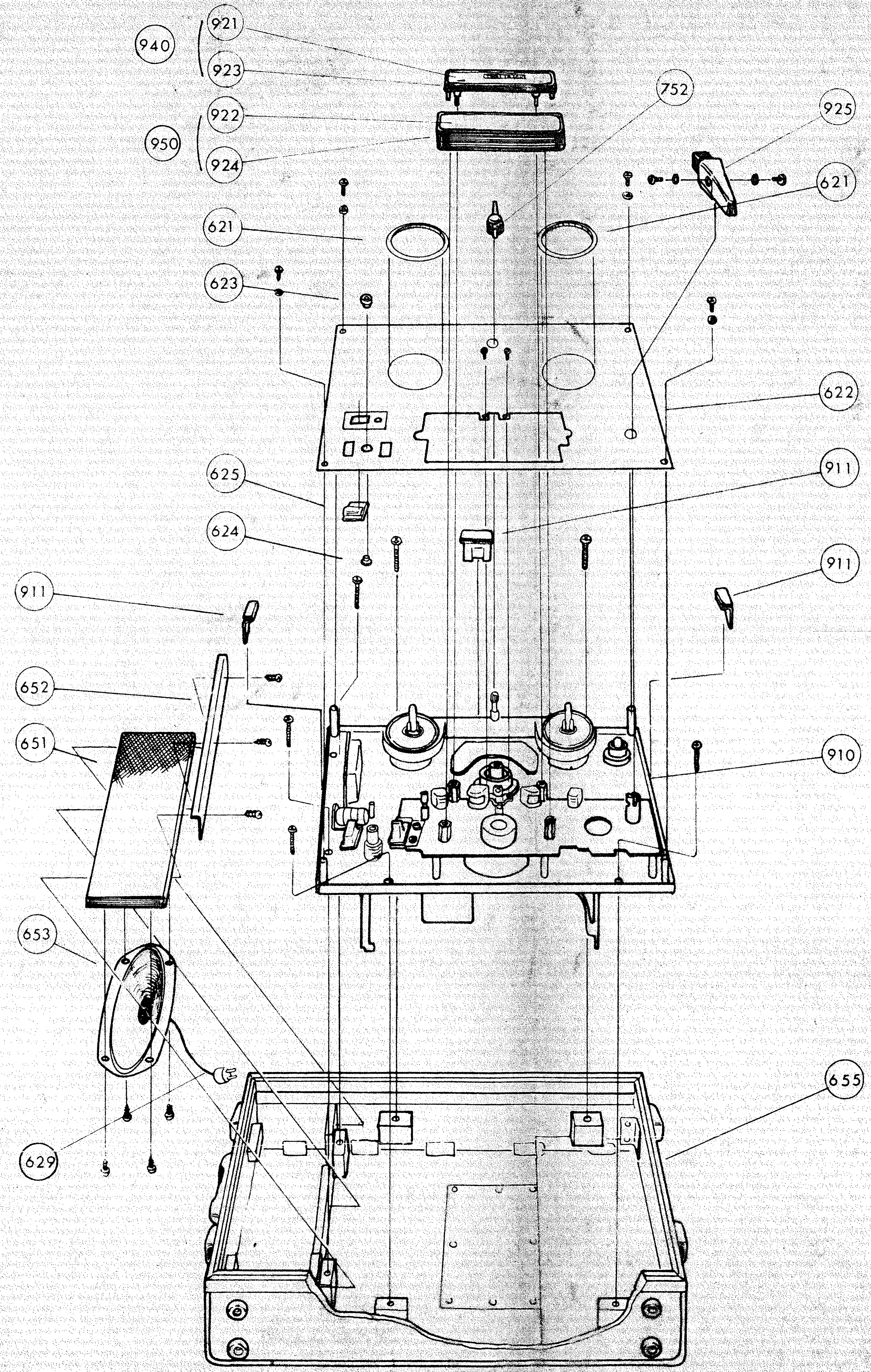
AMPLIFIER (BOTTOM)


LINE IN
MIC IN
RECORD SERECTOR
REC.
P.B
REC
P.B
RECORD
REC. LEVEL SET.
P.B LEVEL SET.
SPEAKER
POWER AMP.
SPEAKER SELECTOR
EXT. SPEAKER
SP.
REC P.B HEAD
P.B
REC.
BIAS TRAP
REC CAL.
METER SET.
VU METER
BIAS ADJ.
ERASE HEAD
P.B
REC
REC
P.B
BIAS OSC.
REC. EQ.
POWER AMP.
P.B REC AMP.
AC POWER

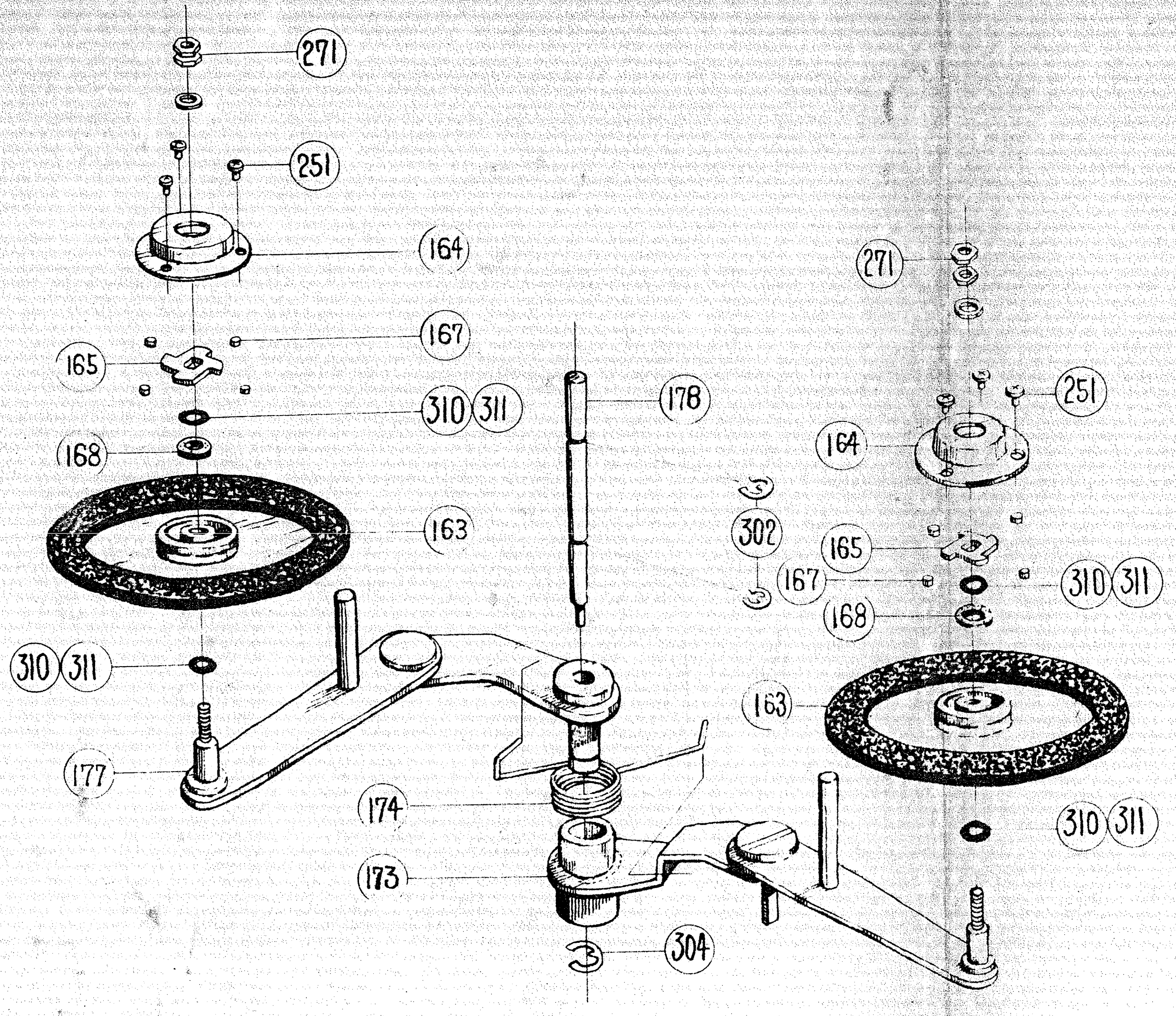
A-2020 BLOCK DIAGRAM

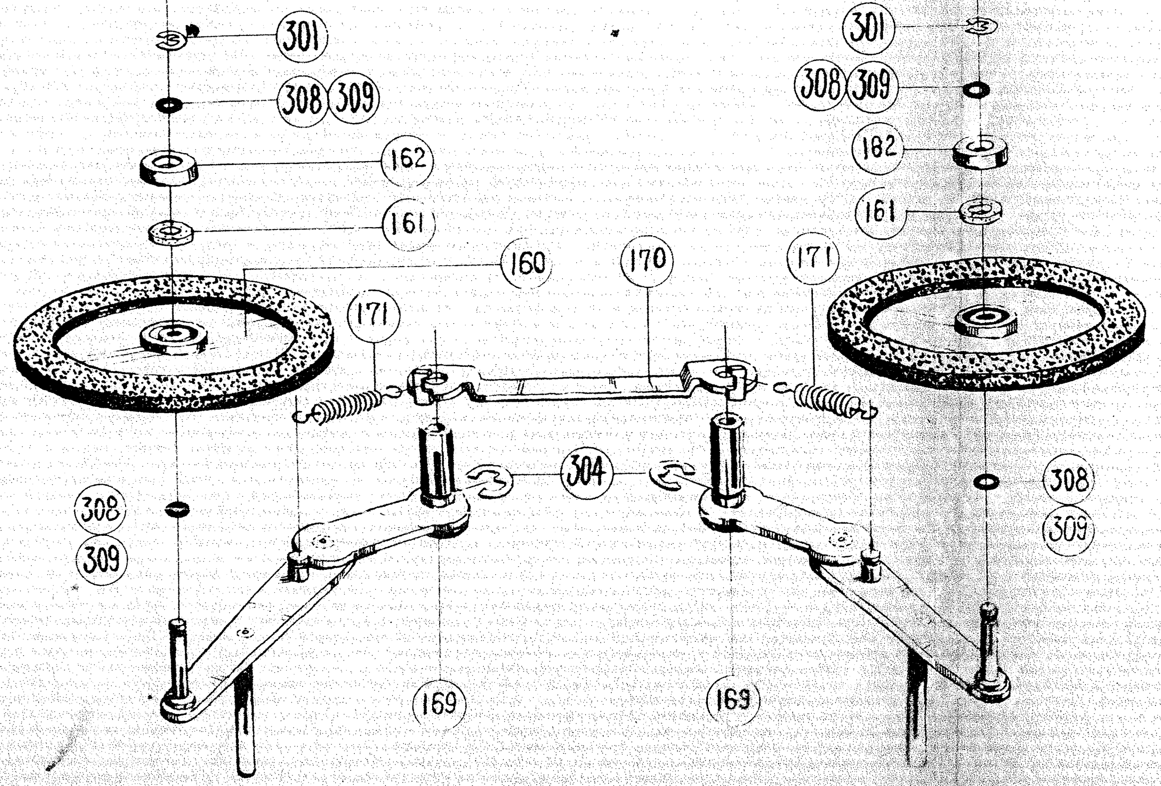

Q101 2SC369
Q102 2SC369 Q103 2SC372
Q104 2SC372 Q107 2SC486 (Y) Q108 Q109 2SC491 (BLU)
PB HEAD
MIC IN
LINE IN
PB
Rec
R101
R102
3.5V
6.5V
2.8V
2.75V
19.8V
21.5V
PB
Rec
0.65V
NF
2.7V
10V
0.07V
0.01V
2.05V
0.65V
SPEAKER VR
R137
0.2V
10.0V
2.9V
1.3V
0.95V
18V
22.0V
10.0V
2.3V
0.23
11.5V
11.2V
11V
0.5V
0.2V
NF
SP
Rec HEAD
10.0V
12.3V
0.62V
0.6V
R128
R103
Rec ADJ
M.ADJ
3.5V
12.0V
2.4V
2.78V
LEVEL METER
Q106 2SC372
LINE OUT
Q105 2SC372
28V
20.0V
-0.9V
2.0V
0.7V
Q1~2
BIAS OSC
+20
+10
0
-10
-20
-30
-40
-50
-60
-70
LINE IN
R101 R102
MIC IN
HEAD IN
Q101
EQ
Rec VR
Q102 Q103
LINE OUT
R137
SP VR
Q104
METER ADJ
Q105
LEVEL METER
Rec LEVEL ADJ
Q106
RECORD HEAD
POWER AMP
Q107 Q108 Q109
4W/8Ω
R163 R164
PHONE 180mW/8Ω

A-2020 SIGNAL LEVEL AND DC; VOLTAGE CHART

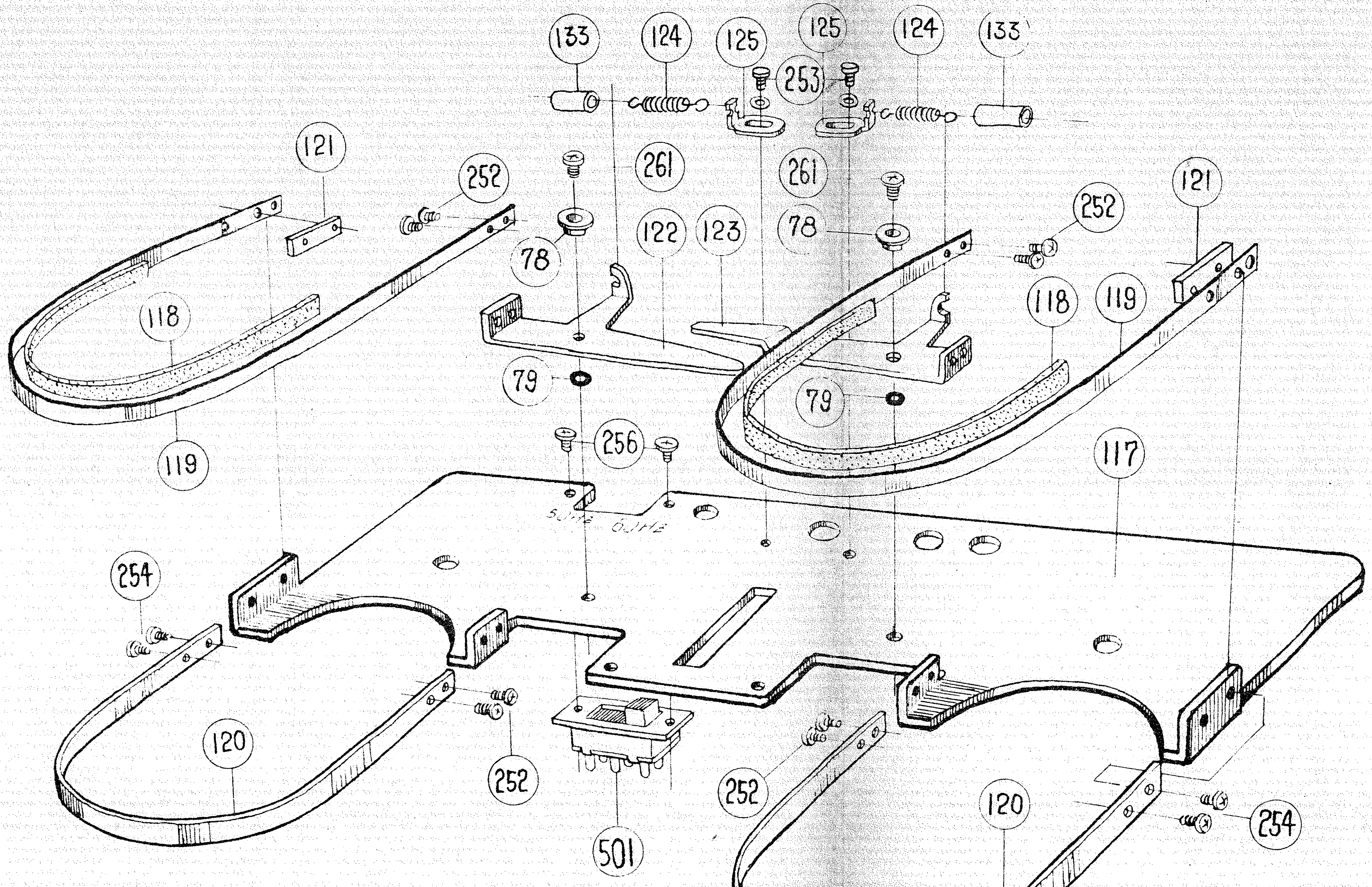

921
940
923
922
950
924
752
925
621
621
623
622
625
911
624
911
911
652
651
910
653
655
629

REF. NO.	PART NO.	DESCRIPTION
621	27403	Ring
911	82009	Panel Rest
652	28536	Speaker Sash
651	28539	Speaker Baffle
653	63027	Speaker
910	87010	Deck
655	28546	Leather Case
629	43240	2P Plug
921	13406	Housing Plate A
922	13407	- do. - B
923	13404	Head Housing A
924	13405	- do. - B
925	25038	Function Lever Assembly
752	25279	Knob A
940	13016	Complete Head Housing A
950	13017	- do. - B

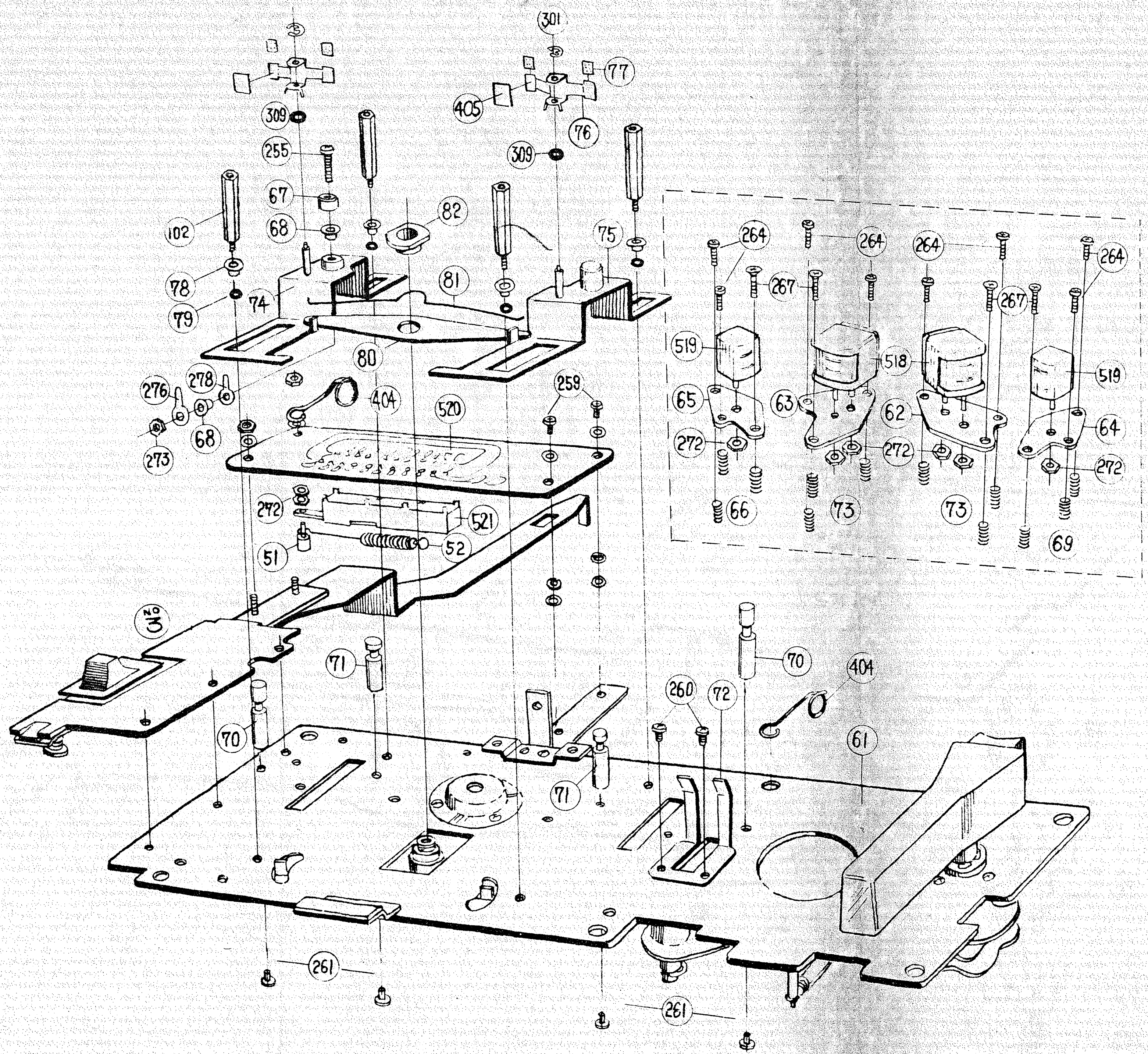

271
251
164
167
165
310
311
168
163
178
177
174
173
304
302
271
251
164
165
167
310
311
168
163
310
311


301
308
309
162
161
160
170
171
171
304
308
309
169
169
301
308
309
162
161
308
309

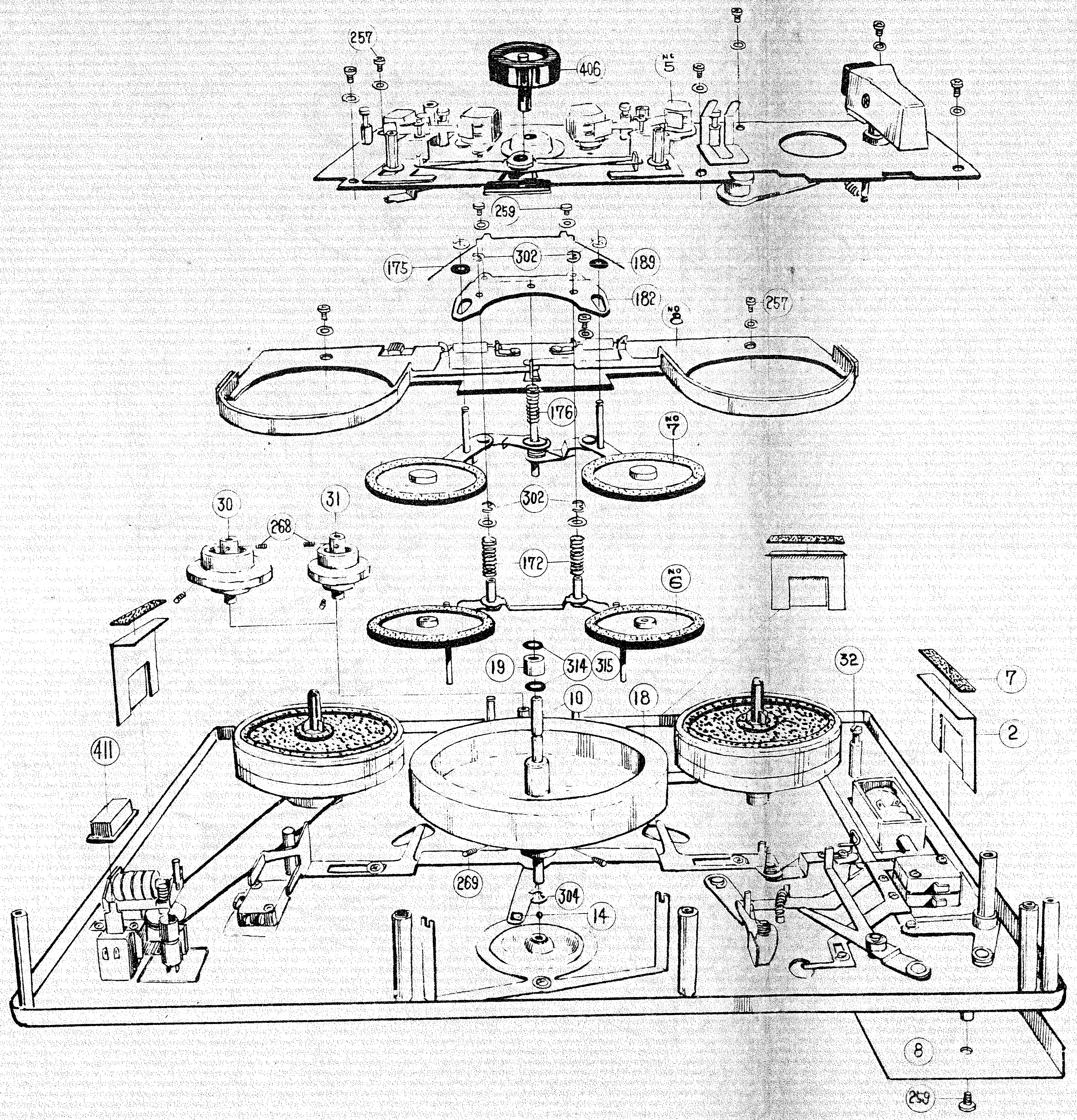
REF. NO.	PART NO.	DESCRIPTION
163	82236	Idler Wheel
164	82242	Bearing Cover
165	82243	Ratchet Cam
167	82244	Ratchet Roller
168	82245	Felt Washer
173	82258	Lever Assembly AC
174	82269	Spring
177	82272	Lever Assembly BC
178	82273	Shaft
251	21268	Screw 2 × 3
271	21126	Nut 3P = 0.5
302	21611	Retainer Clip 3.2ϕ
304	21613	- do. - 5ϕ
310	82306	Washer 4.0 × 0.13
311	82307	- do. - 4.0 × 0.25
160	82228	Idler Wheel
161	82233	Felt Washer
162	82235	Bearing
169	82246	Lever Assembly
170	82253	Connecting Plate
171	82255	Spring
301	21610	Retainer Clip 2.3ϕ
304	21613	- do. - 5ϕ
308	82304	Washer 3.0 × 0.13
309	82305	- do. - 3.0 × 0.25


133
124
125
125
253
124
133
121
252
261
261
78
78
252
121
122
123
118
118
119
119
79
79
256
117
254
120
252
501
252
120
254

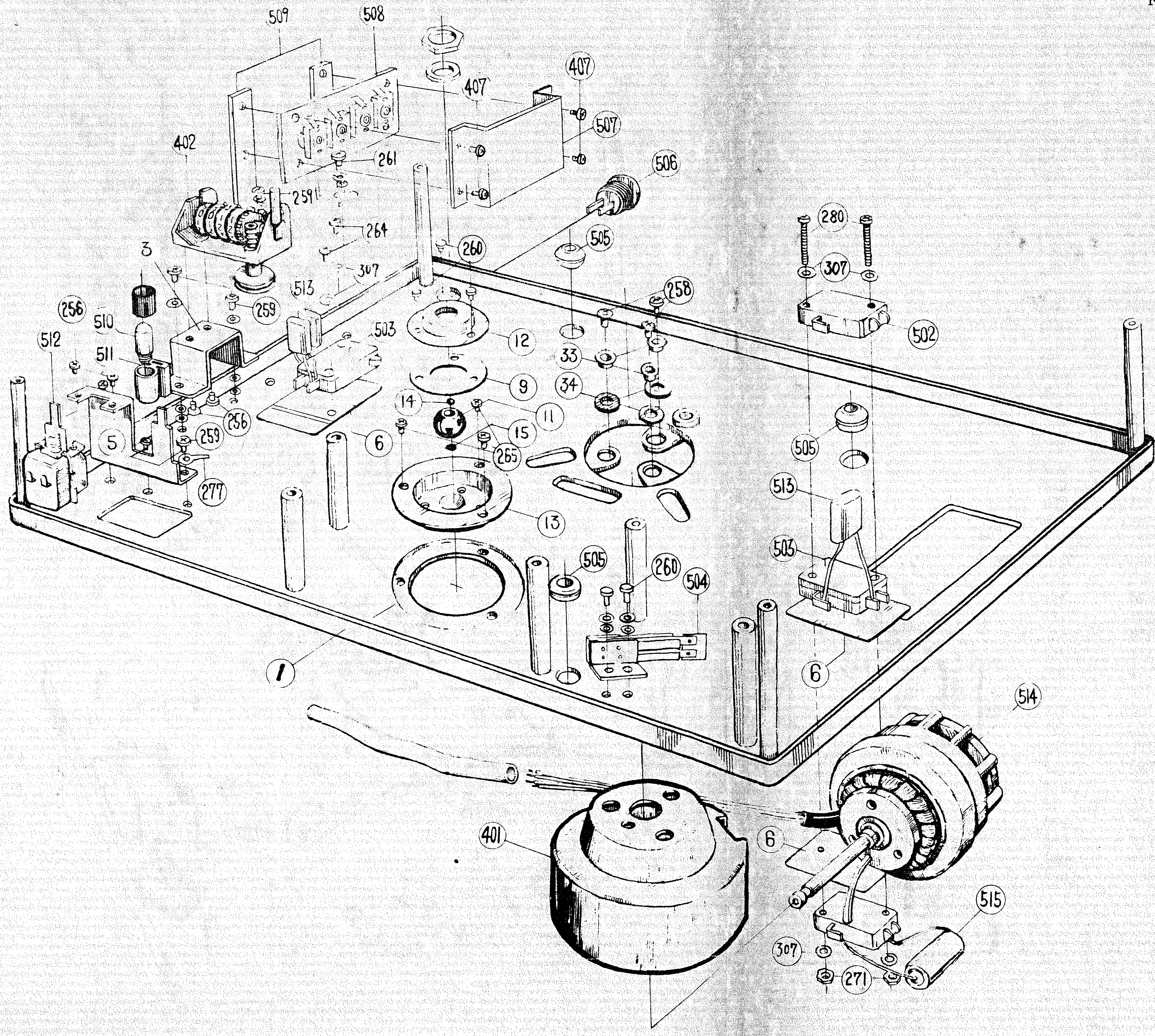
REF. NO.	PART NO.	DESCRIPTION
78	82107	Thrust Bearing
79	82108	Washer
117	82174	Brake Mounting Plate
118	82177	Brake Shoe
119	82178	Brake Band
120	82179	Brake Band Retainer
121	82180	Nut Plate
122	82181	Brake Lever A
123	82182	- do. - B
124	82183	Spring
125	82184	Brake Adjust Clip
133	82204	Vinyl Tube 5ø × 15
252	21263	Screw 2.6 × 3
253	21264	Screw 2.6 × 4
254	21020	Screw 2.6 × 6
256	21022	Screw 3 × 5
261	21033	Screw 3 × 6P = 20.5
501	44408	Slide Switch


301
77
405
76
309
309
255
67
68
82
102
75
78
79
74
81
80
278
276
68
273
404
520
259
272
521
51
52
71
70
260
72
70
404
61
71
70
261
261
264
264
264
264
267
267
519
518
519
65
63
62
64
272
272
272
66
73
73
69

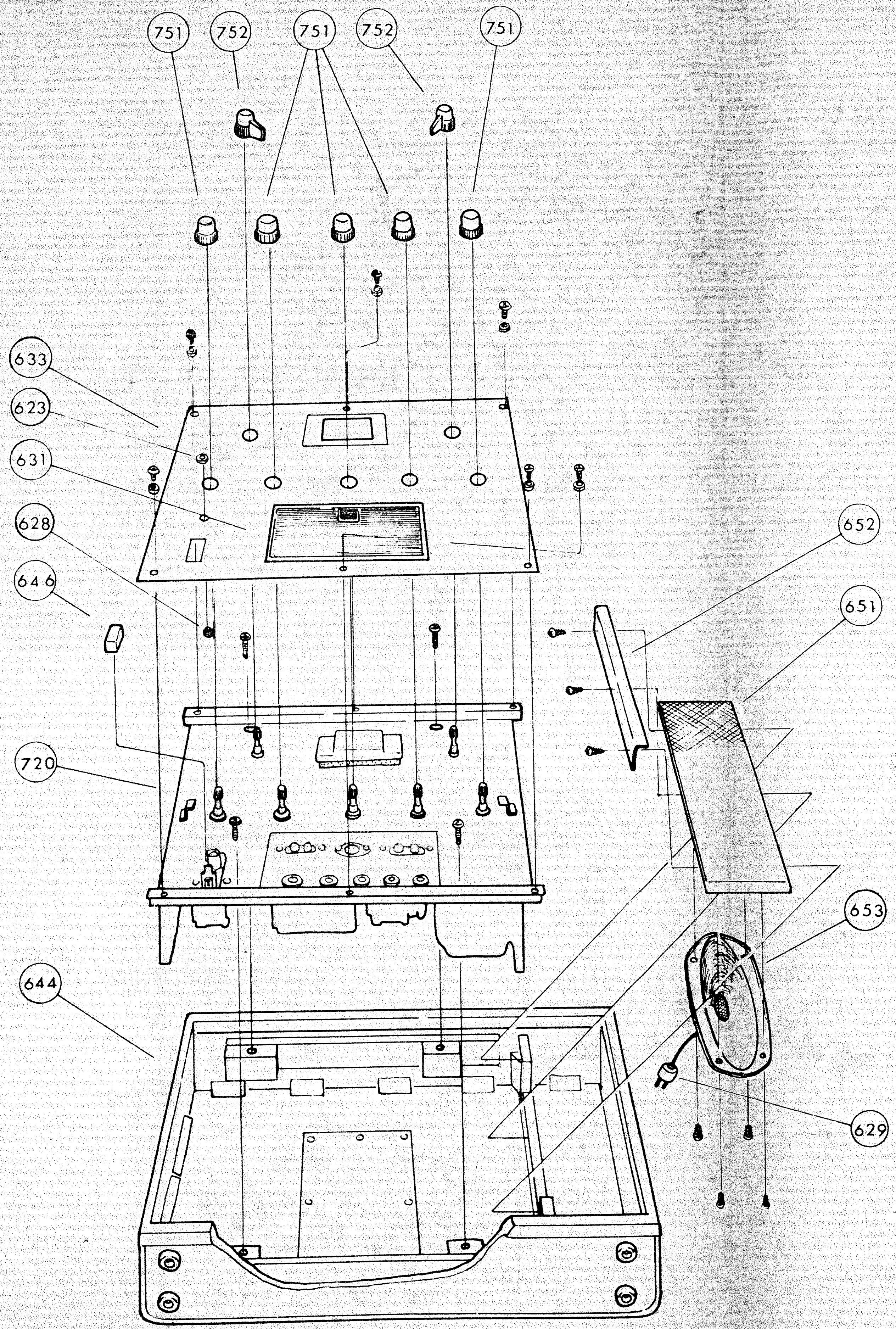
REF. NO.	PART NO.	DESCRIPTION
51	82076	Spring Retainer
52	82078	Spring
61	82082	Base Plate
67	82089	Spacer A
68	82091	Collar
70	82093	Tape Guide A
71	82094	- do. - B
72	82095	Auto Shut-off Guide
74	82097	Bracket A
75	82100	- do. - B
76	82103	Pressure Pad Spring
77	82104	Pad
78	82107	Collar
79	82108	Washer
80	82109	Shifter Plate
81	82110	Spring
82	82112	Thrust Bearing
88	82129	Printed Board Retainer
102	82159	Stand-off
255	21021	Screw 2.6 × 16
259	21030	Screw 3 × 5P = 0.5
260	21032	Screw 3 × 4P = 0.5
261	21033	Screw 3 × 6P = 0.5
264	21035	Screw 3 × 15P = 0.5
267	21442	Screw 3 × 15P = 0.5
272	21127	Nut 2
273	21128	Nut 2.6
276	82301	Lug 2.8 ϕ
278	82303	Lug 4.2 ϕ
301	21610	Retainer Clip 2.3 ϕ
309	82305	Washer 3.0 × 0.25
404	27424	Cable Clip
405	13412	Head Shield
518	66951	Record/Playback Head
519	66303	Erase Head
520	48109-1	Head Switching Printed Board
521	44413	Slide Switch


257
406
No 5
259
175
302
189
182
No 8
257
176
No 7
302
30
31
268
172
No 6
19
314
315
32
7
10
18
2
411
269
304
14
8
259

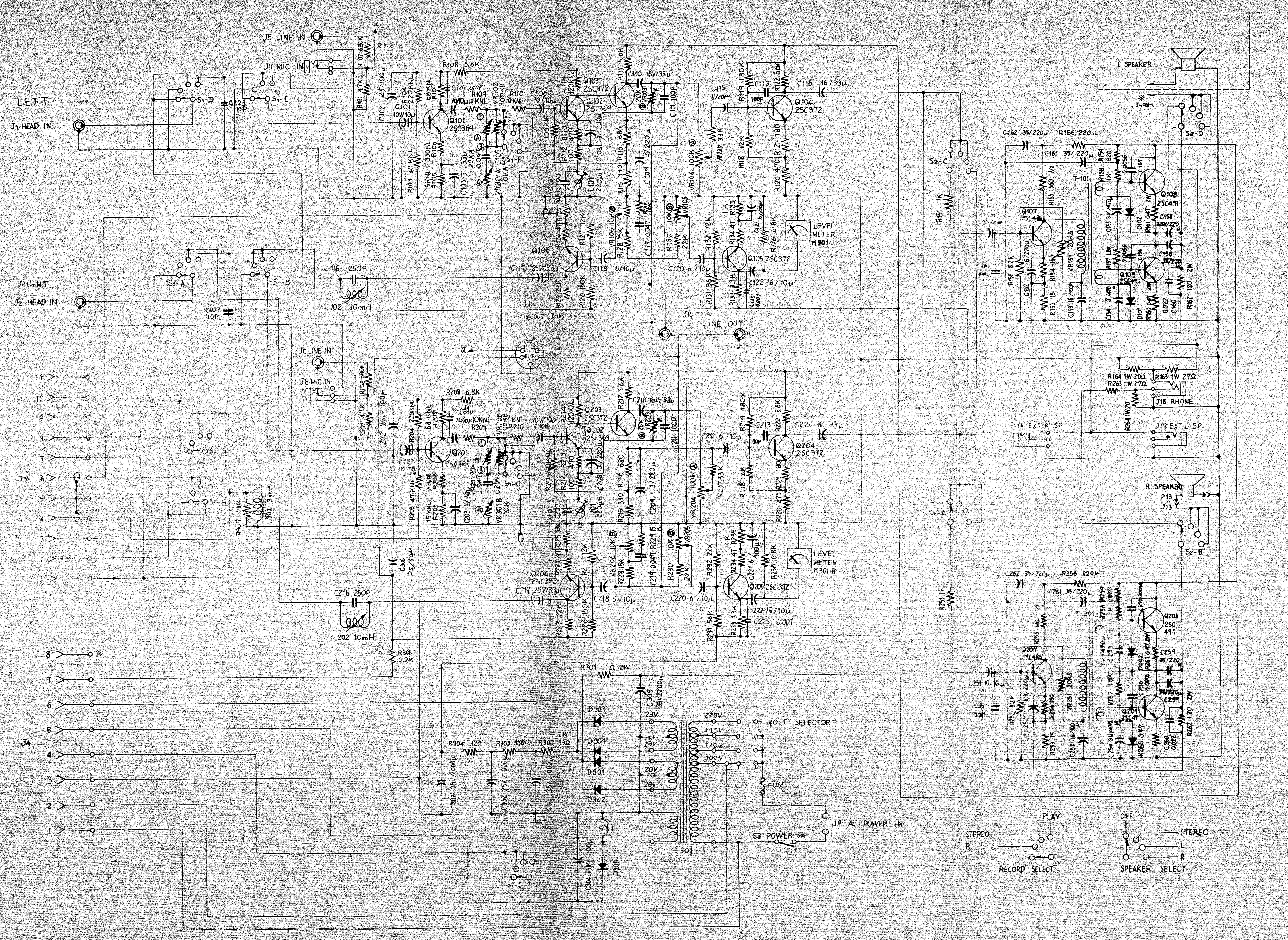
REF. NO.	PART NO.	DESCRIPTION
2	82002	Panel Rest
7	82010	Rubber Cushion
8	82011	Brake Band Assembly
10	82013	Capstan Shaft
14	82148	2φ Ball Bearing
18	82021	Fly Wheel
19	82022	Flywheel Bushing
30	82038	Motor Pulley 50 Hz
31	82040	- do. - 60 Hz
32	82041	Spare Motor Pulley Holder
172	82256	Spring
175	82270	Washer
176	82271	Spring
182	82279	Idler Retainer Plate
189	82291	Washer
257	21235	Screw 4 × 6
259	21030	Screw 3 × 5P = 0. 5
268	21750	Set Screw 4 × 4
302	21611	Retainer Clip 3. 2φ
304	21613	- do. - 5φ
314	82310	Washer 6. 0 × 0. 13
315	82311	- do. - 6. 0 × 0. 25
406	14017	Pinch Roller Assembly
411	27406	Push-button (Red)


509
508
407
407
507
506
402
261
259
264
307
3
260
505
258
280
307
513
259
256
510
503
12
502
512
511
33
9
34
11
14
256
259
5
6
15
265
505
277
513
13
503
505
260
504
6
1
514
401
6
515
307
271

REF. NO.	PART NO.	DESCRIPTION
1	82001	Chassis Assembly
3	82005	Counter Retainer
5	82007	Record Switch Retainer Plate
6	82008	Switch Insulator Board
9	82146	Washer
11	82014	Bronze Bushing
12	82015	Retaining Cover
13	82016	Bearing Retainer
14	82148	2ϕ Ball Bearing
15	82017	Plate
33	82042	Motor Retaining Cock
34	82043	Rubber
256	21022	Screw 3 × 5
258	21269	Screw 4 × 10
259	21030	Screw 3 × 5P = 0.5
260	21032	Screw 3 × 4P = 0.5
261	21033	Screw 3 × 6P = 0.5
264	21035	Screw 3 × 15P = 0.5
271	21126	Nut 3P = 0.5
277	82302	Lug 3.2ϕ
307	82314	Washer 3.3ϕ × 8ϕ × 0.5ϕ
401	27420	Motor Shield Plate
402	58507	Index Counter
502	44611	Micro Switch (v-51A44-104)
503	44610	Micro Switch (v-1A5)
504	44710	Leaf Switch
505	42301	Grommet
506	43455	Plug 2P
507	23273	Bias Shield Plate
508	48114	Bias Printed Plate Assembly
509	23261	Washer B
510	41429	Record Lamp
511	41503	Lamp Socket
512	44341	Record Switch
513	54806	Mylar Capacitor 0.1 M
514	70221	Outer Rotor Motor
515	54839	Mylar Capacitor 0.1 M

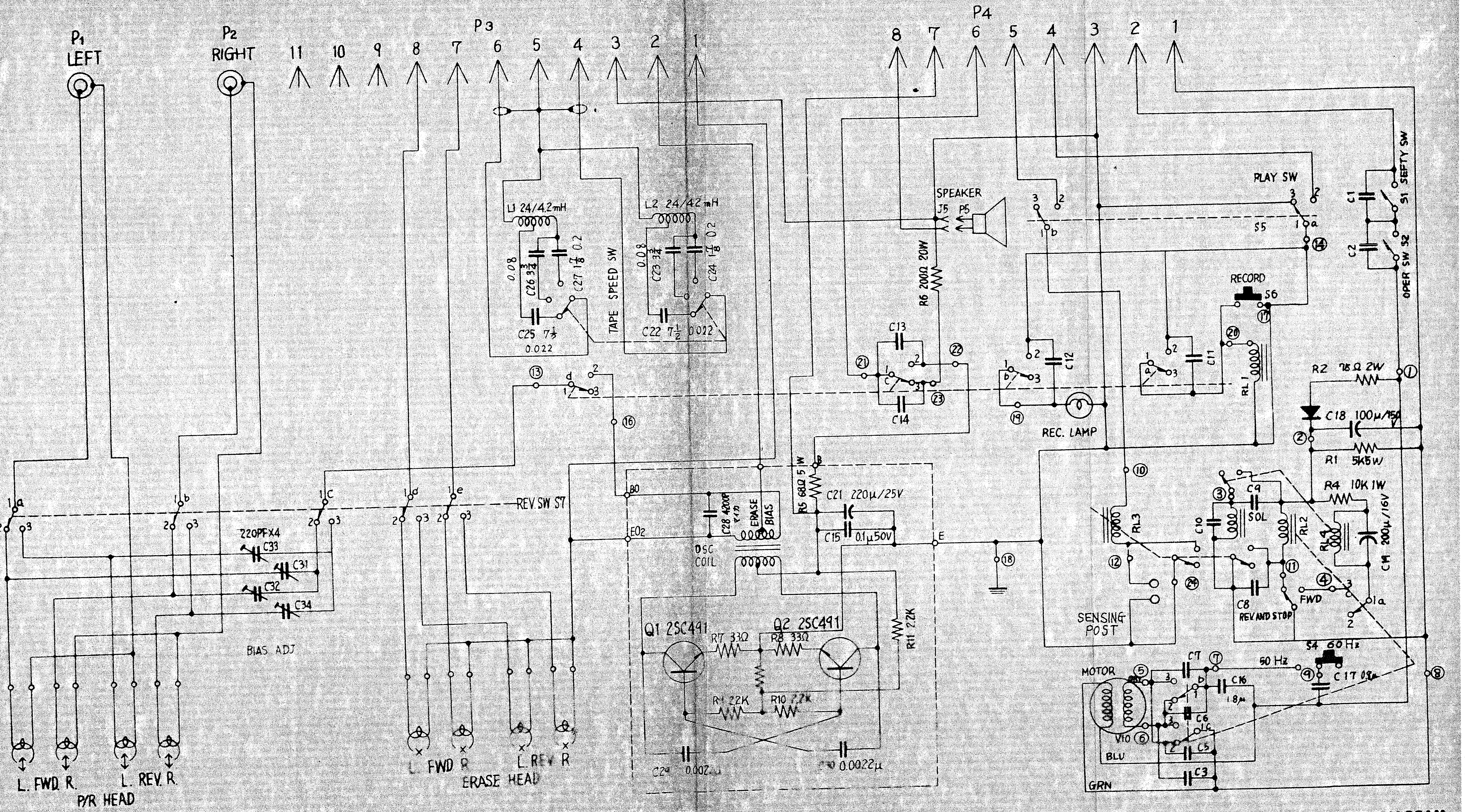

751
752
751
752
751
633
623
631
628
646
720
644
652
651
653
629

REF. NO.	PART NO.	DESCRIPTION
622	11213	Deck Dress Panel
623	27396	Pilot Light Lens Ring
624	27395	Pilot Window
625	27404	Counter Lens
628	27402	Pilot Light Lens
629	43240	2P Plug
631	23258	Connector Cover
633	23256	Amp. Dress Panel
644	28546	Leather Case
646	27407	Button
651	28539	Speaker Baffle
652	28536	Speaker Sash
653	68027	Speaker
720	40047	Complete Amplifier
751	25280	Knob A
752	25279	Knob B


LEFT
J1 HEAD IN
J5 LINE IN
J7 MIC IN
RIGHT
J2 HEAD IN
J6 LINE IN
J8 MIC IN
S1-D
S1-E
S1-A
S1-B
S1-F
S1-G
S1-H
S1-I
Q101 2SC364
Q102 2SC364
Q103 2SC372
Q104 2SC372
Q105 2SC372
Q106 2SC372
Q201 2SC368
Q202 2SC364
Q203 2SC372
Q204 2SC372
Q205 2SC372
Q206 2SC372
Q107 2SC486
Q108 2SC491
Q109 2SC491
Q207 2SC486
Q208 2SC491
Q209 2SC491
T-101
T-201
L102 10mH
L202 10mH
L301 3mH
C116 250P
C216 250P
J12 IN/OUT (DIN)
J10 LINE OUT
J11
LEVEL METER M301-L
LEVEL METER M301-R
L SPEAKER
R SPEAKER
J15 PHONE
J14 EXT. R SP
J19 EXT. L SP
S2-A
S2-B
S2-C
S2-D
J3
J4
R301 1Ω 2W
D301
D302
D303
D304
D305
T301
VOLT SELECTOR
220V
115V
110V
100V
23V
20V
FUSE
J9 AC POWER IN
S3 POWER SW
R304 120
R303 330Ω
R302 33Ω
C303 25V/1000μ
C302 25V/1000μ
C301 35V/1000μ
C305 35V/2200μ
STEREO
R
L
PLAY
RECORD SELECT
OFF
STEREO
L
R
SPEAKER SELECT

A-2020 RECORDING/PLAYBACK AMPLIFIER SCHEMATIC DIAGRAM

NOTE: COMPONENT VALUES ARE SUBJECT TO CHANGE WITHOUT NOTICE.
S1-A – S1-I CONNECTED
S2-A – S2-D CONNECTED


P1 LEFT
P2 RIGHT
P3
11 10 9 8 7 6 5 4 3 2 1
P4
8 7 6 5 4 3 2 1
L1 24/4.2mH
L2 24/42mH
C26 3¾ 0.08
C27 1⅞ 0.2
C25 7½ 0.022
C23 3¾ 0.08
C24 1⅞ 0.2
C22 7½ 0.022
TAPE SPEED SW
SPEAKER
J5 P5
R6 200Ω 20W
PLAY SW
S5
SEFTY SW S1
OPER SW S2
C1
C2
RECORD S6
C13
C14
C12
C11
REC. LAMP
RL 1
R2 78Ω 2W
C18 100μ/150
R1 5K5W
R4 10K 1W
C19 200μ/16V
RL3
RL2
RL4
SOL
C9
C10
C8 REV AND STOP
FWD
SENSING POST
MOTOR
BLU
GRN
C7
C16 1.8μ
C6
C5
C3
50 Hz
S4 60 Hz
C17 0.8μ
R5 68Ω 5W
C21 220μ/25V
C15 0.1μ50V
E
BO
EO2
C28 4200P
ERASE
BIAS
OSC COIL
Q1 2SC491
Q2 2SC491
R7 33Ω
R8 33Ω
R9 2.2K
R10 2.2K
R11 2.2K
C29 0.0022μ
C30 0.0022μ
REV. SW S7
220PFX4
C33
C31
C32
C34
BIAS ADJ
L. FWD. R.
L. REV. R.
P/R HEAD
L FWD R
L REV R
ERASE HEAD

A-2020 BIAS OSCILLATOR AND TAPE TRANSPORT MECHANISM SCHEMATIC DIAGRAM

NOTE COMPONENT VALUES ARE SUBJECT TO CHANGE WITHOUT NOTICE.
C_1 ~ C_{11} 0.1μF250WV
① ~ ㉔ NUMBER OF PRINTED BOARD